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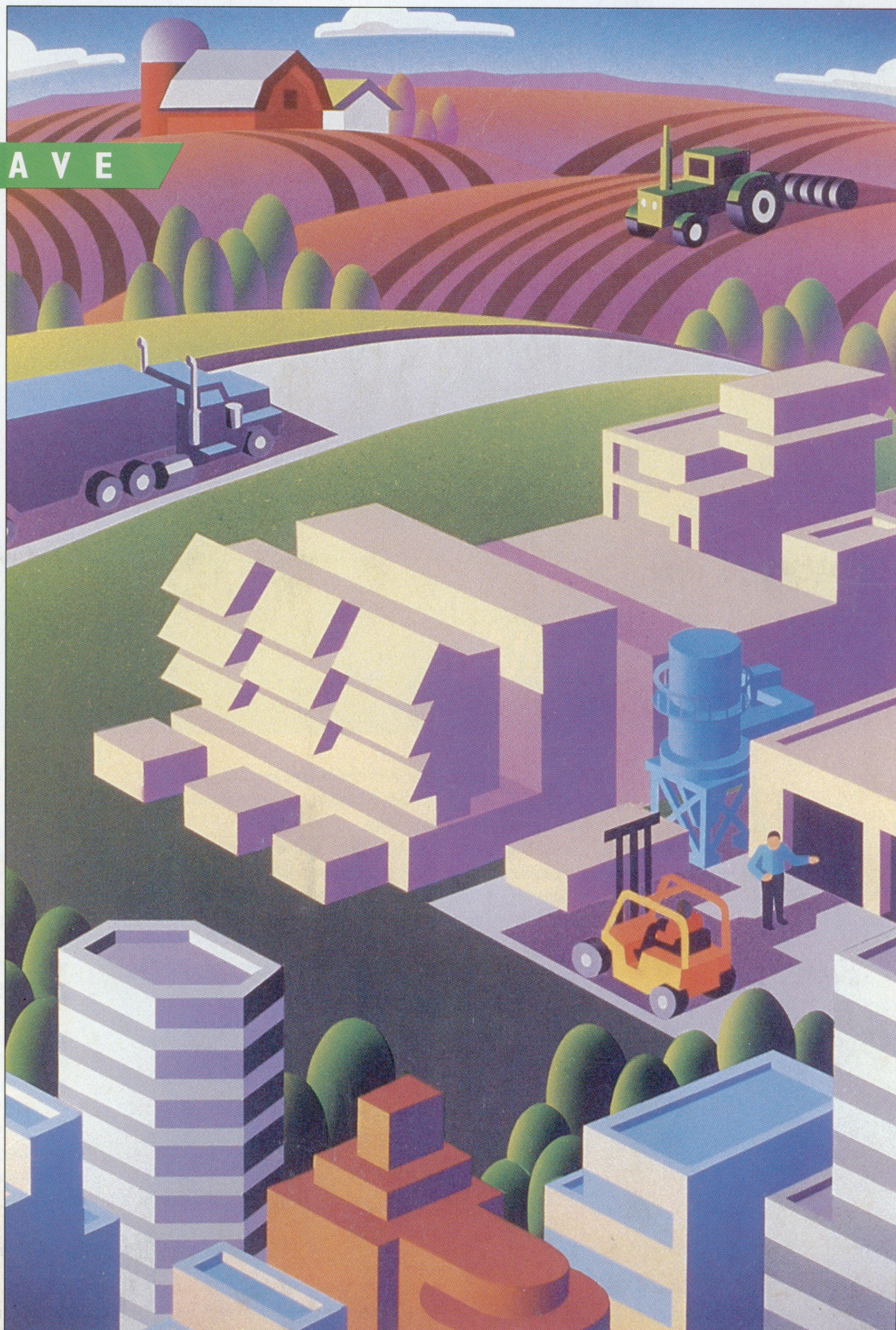
THE INDEPENDENT MAGAZINE FOR NEWWAVE COMPUTING ▲ VOL.5 NO.11

NOVEMBER 1991 ▲

NEW WAVE

Enterprise Wide Integration

- ▶ Design For Manufacturability:
Follow The Tao
- ▶ Build Your Trading
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Exercise In EDI
- ▶ Driving Integrated
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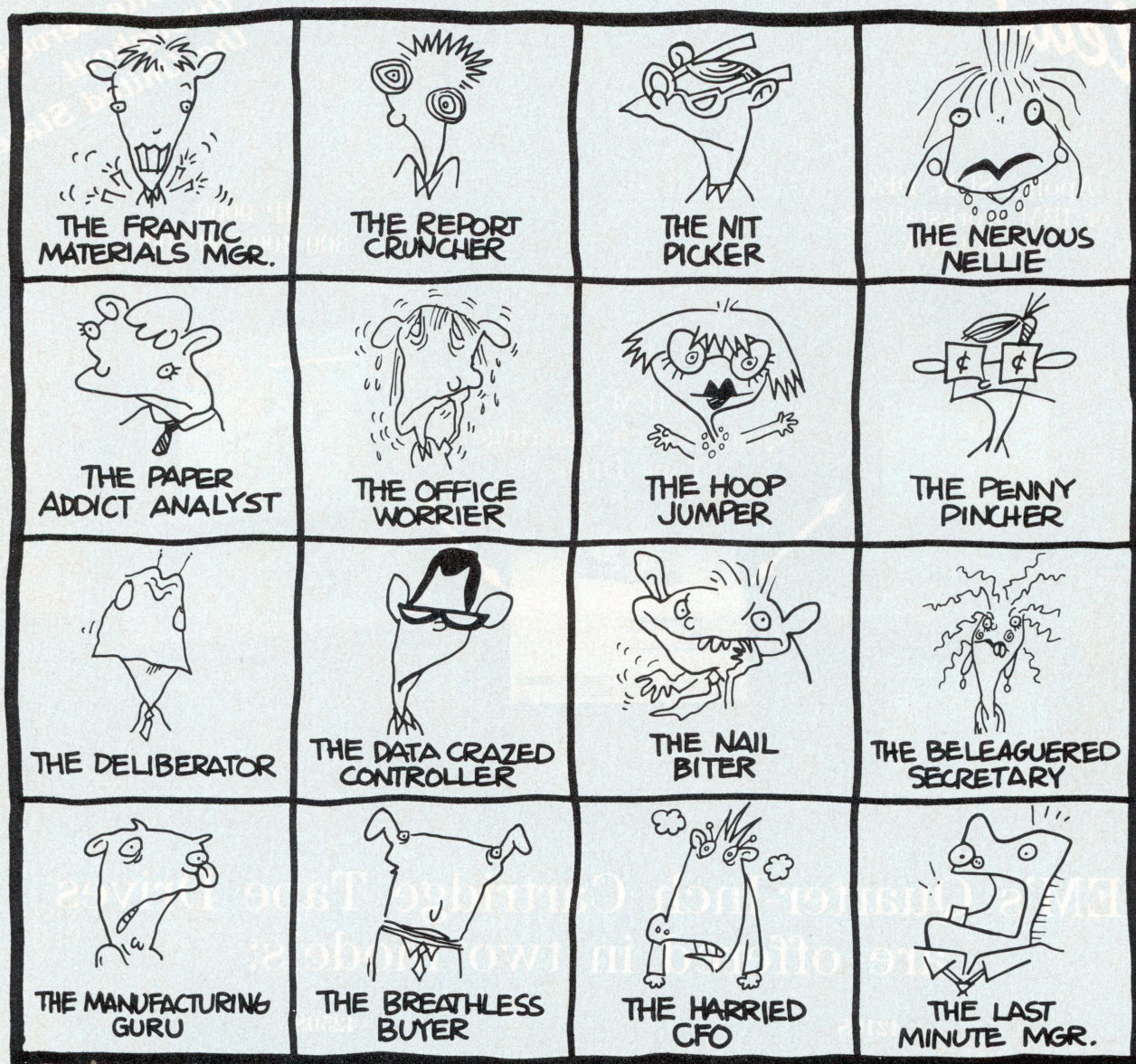
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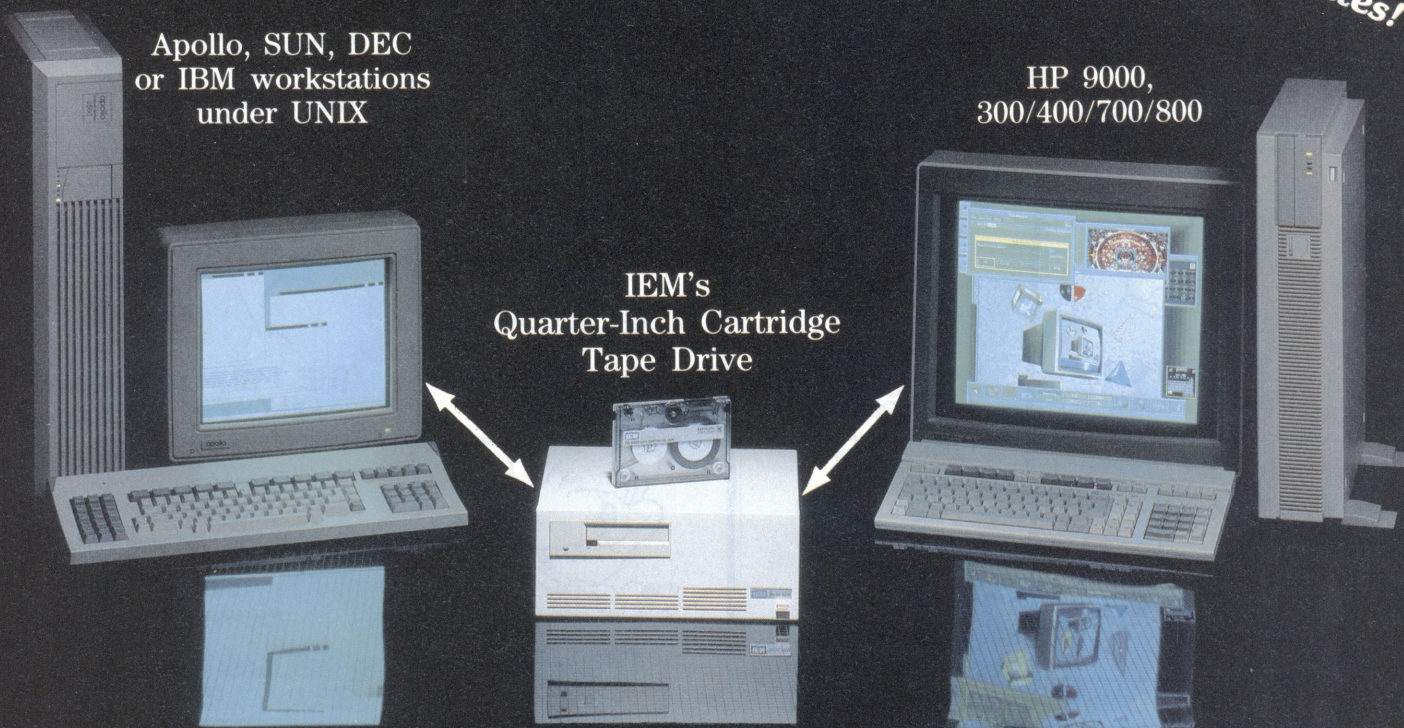
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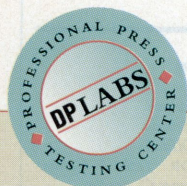
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Making History

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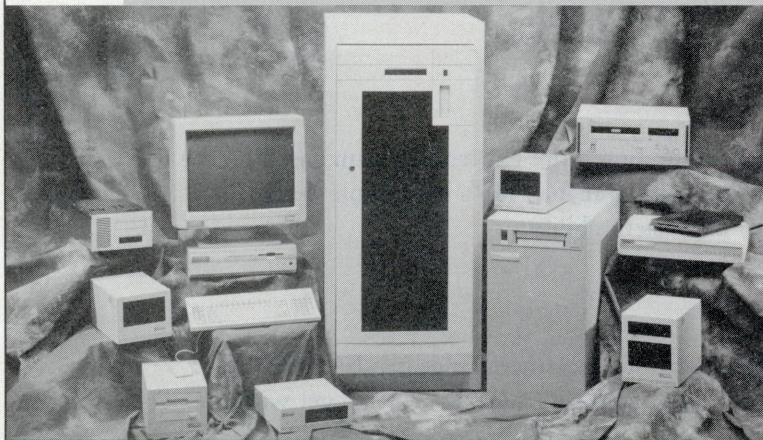
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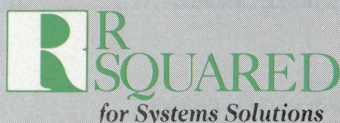
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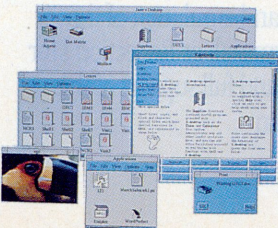
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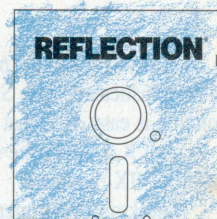
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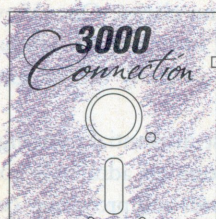
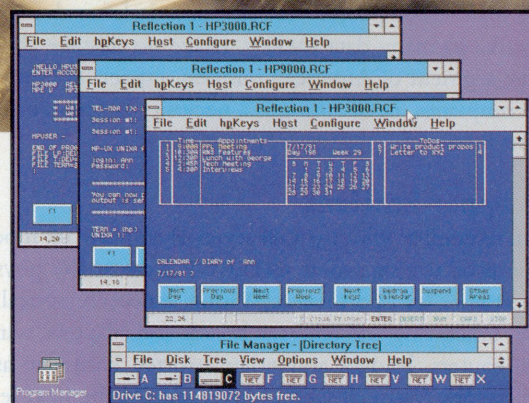
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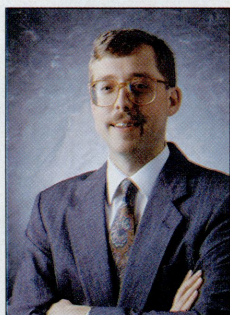
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Pulling It All Together



By Don Marks

At this writing, I've just returned from the INTEROP networking conference in San Jose (October 8-11). This is a truly fascinating conference, which for the exhibits alone, I would strongly recommend to any HP user. All 275-plus exhibitors at the show, including HP, DEC, IBM and Sun, have their products running on the shownet network—along with a Sunbeam toaster, an electric train and a host of other mission critical applications. I kid you not, it was all there,

it all worked, albeit intermittently, and it was one big LAN.

More significant than this multivendor, multiplatform environment *in extremis*, however, were the show's many tutorials, sessions, demonstrations and press conferences, all which were among the most heavily attended of any I have ever seen. INTEROP, on the whole, was strikingly well-attended, with more than 40,000 people bumping and dodging about the show floor like so many data packets. Make no mistake about it, for a large segment of American business, especially Fortune 1000-size companies, networking is a necessity, a prerequisite of doing business.

The Upper Echelons

If you're familiar with the OSI seven-layer network model, most of the products shown at INTEROP were at the physical link and network transport levels. Wiring, especially optical fiber for FDDI, token ring and ethernet boards and adapters, wire testers, hubs, routers, bridges and other assorted hardware aspects of the network, were all well represented. At the next level, network management applications were all the rage—there must have been at least 20 offerings, including HP's own OpenView Network Node Manager. But the consensus among the attendees was that as spectacular as some of these products appear to be, a truly salable level of functionality still hasn't arrived.

There was, however, at least one offering, COMMAND from ISICAD, that struck me as profoundly useful for managers of larger networks, although a little pricey. COMMAND allows you to scan in architectural drawings of all your company's offices so that you have a floor by floor, office by office map of every work place in your company. You can then overlay on top of this a map of your network including every node and every segment of wire. It also includes a database in which you can store any significant information regarding the functionality of

any network node (i.e., its user, departmental location, its use and importance to the system, service contracts, etc.).

You can then integrate the complete map and database can with HP's OpenView Network Node Manager. When a node is down or a segment is interrupted, OpenView alerts the network manager who can access the map, obtain the database information—simply by clicking on the problem node—and call for service. The whole process is relatively simple, considering the amount of graphic information involved, and the software runs efficiently on a single HP workstation. I was duly impressed, until I caught the price tag: \$35,000 to start, without OpenView. Alas, only the upper echelon guys can play at this layer.

The Open Mind

Next to hardware, network management is perhaps HP's greatest strength. The OpenView network management strategy has received wider acceptance and more extensive industry endorsement than any other HP offering. As has been widely reported, IBM has licensed parts of the OpenView suite for its NetView product, and last month OSF announced that the OpenView Network Management Server would form the core of its Distributed Management Environment (DME). OpenView, like other nebulous networking strategies (DEC's NAS and IBM's SAA), is less a product than an overarching concept used to integrate what would otherwise be a slew of loose ends.

At present, OpenView includes not only the Network Management Server, but also test and measurement products like the HP LANprobe and network support solutions, such as the HP Network License System. Aside from the name, HP's OpenView products do have one other unifying element—they all run under one consistent Motif-based graphical user interface, which HP has dubbed with shattering clarity, OpenView Windows. In the mix and match spirit of open systems, HP has architected OpenView in such a way as to allow the integration of other vendors' products.

Overall, when compared with its most substantial midrange competitors—DEC and IBM—HP has done an admirable job of promoting industry networking standards and providing cooperative network management tools. Vigorous support for multivendor connectivity, together with best-in-class network management and facility with the language of open systems, so far has helped HP get a foot in the data center door.

A handwritten signature in cursive script that reads "Don Marks".

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INDUSTRY WATCH

Bill Sharp

a bit cocky. It's a common flaw of the species. They don't seem to be able to do much about it. So, those of us extra-terrestrials who sit around watching the show make attempts from time to time to keep egos in check.

And, as you might expect, HP's resounding success of late has caught our collective eye. The rascals just can't ship enough of those new workstations, and ... blah, blah, blah, you've heard it all already. Looks great, doesn't it? They can clearly do no wrong—today. But today's prognosis of vigorous growth can and will change with new market dynamics.

Headlines, Now And Then

High-performance PCs (386s and higher) once sold for prices ranging upward from \$5,000. Today, they can be had for under \$1,000. Workstations once cost \$40,000 and up. Today, they run from \$4,000 and up. Mini-computers once cost \$50,000 and up. Today, they're closer to \$10,000 and up. Each year you can buy more for less. This is old news.

The news for today is that the trend will continue. Hardware prices will continue to drop steadily until some limit of

solid state physics is reached, and that won't happen until at least the turn of the century, if then. So what, you ask?

Do this. Make a simple chart with the

When they are flying high, humans have a tendency to get

vertical axis representing percent of revenue produced by hardware sales, and the horizontal axis representing time. If you are HP today, at the pinnacle of your success, you are hauling in about 50 percent of revenues from hardware. Ten years from now, Mike Leavell, vice president and general manager of HP's Cooperative Computing Business Unit, *hopes* that number will still be at about 30 percent.

There is likely nothing that HP can do to keep hardware revenues (read profits) growing at the pace they have up to today. The same wonderful growth in RISC that has helped HP reach its present place in the market cannot alone sustain it over the long haul. Thanks to open systems and the competitive market for RISC, new hardware sales simply cannot sustain enough profit margin to keep corporate growth strong.

The Next Big Gamble

What will HP do? Faced with tighter profit margins, it will have to make another chart. This chart will show software and systems integration sales growing with the kind of vigor that hasn't been typical of HP's non-hardware products. And, HP will do its darndest to make that chart a reality.

The irony of all this is that, having bet the company and won during the 1980s with an aggressive

hardware technology, HP must now transform itself to preserve that hard-won growth in the 90s by moving strongly into software and services. HP is not alone in this. Every sizable computer company out there must do the same.

The Backup Plan

HP has slowly and painfully developed some new prowess in software

HP's advantage is that it is healthy at the moment, which helps fund the change.

Does this mean that HP will phase out hardware production? Not likely. As Leavell points out, "Somebody has to make the hardware, it might as well be us! One of our core competencies is producing market-leading hardware." With its command of RISC and manufacturing technologies, HP feels it is well able to continue competing. But margins will grow ever tighter, and eventually hardware production may be relegated to a few large computer chip foundries at places like Intel. Leavell calls this "a tight-rope that we will continue to walk."

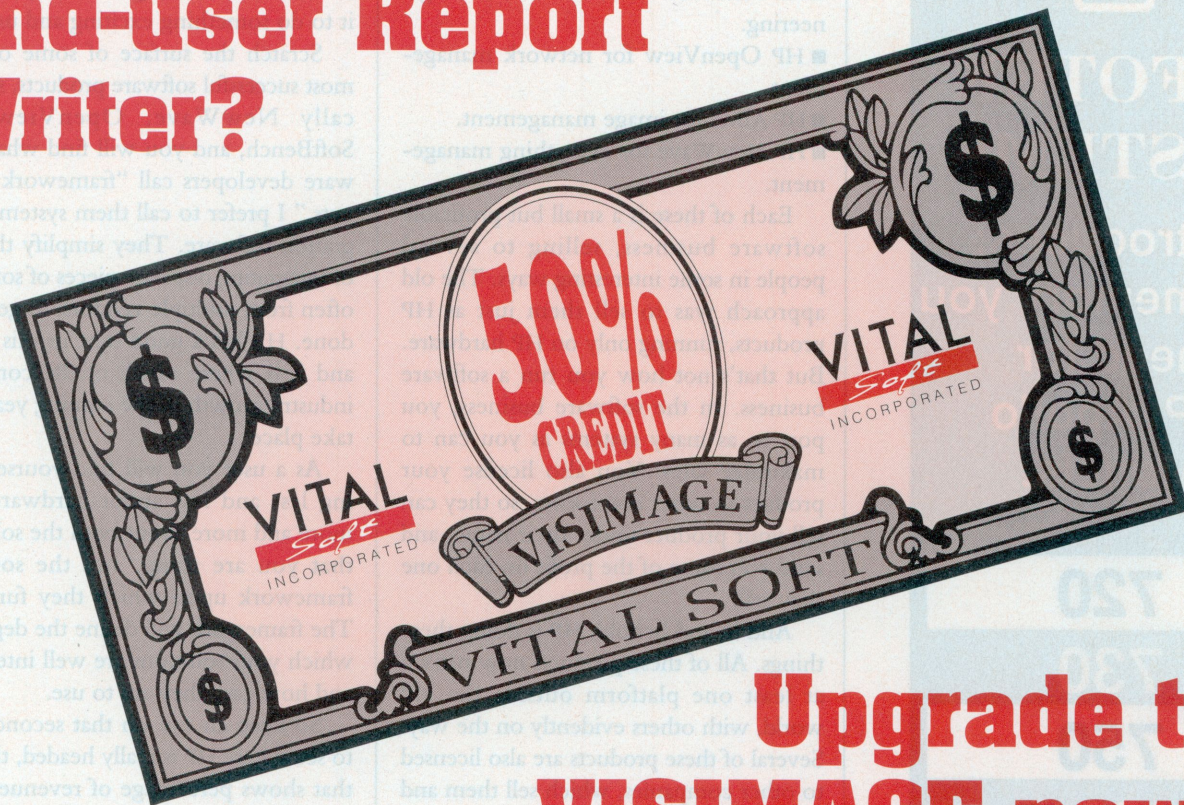
What will change is that the remainder of HP's computer business must become the dominant portion, the tail that wags the dog. And our tale about this tail is that HP's successful history has long been dominated by electrical engineers doing what EEs do best—developing world-beater hardware. However, over the next 10 years, world-beater hardware will generate less and less leverage in the market. World-beater software will be essential.

Software Startups

The good news is that HP has slowly and painfully developed some prowess in software as well. How far that prowess will take the company remains to be seen, but Leavell's charter is to have a good run at making HP's software successful.

Leavell's software scheme is to develop several small software companies within HP, and then help those small companies become big ones. The old days of HP's software existed only to help sell the hardware are fading fast. Several exciting little software companies already

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- HP AIMS for image management.
- HP NewWave for everything management.

Each of these is a small but profitable software business, selling to several people in some interesting ways. The old approach was to sell them just as HP products, running only on HP hardware. But that's not how you run a software business. In the software business, you port to as many systems as you can to maximize sales. You also license your product to other companies, so they can sell your product under their name, and send you some of the profit on each one they sell.

And lo and behold, HP is doing these things. All of these products now run on at least one platform outside the HP world, with others evidently on the way. Several of these products are also licensed to other companies, which sell them and send HP money.

Integration, Now!

Finally, HP has to get heavily involved in the systems integration business. This used to be a field where engineers strapped together lots of weird-looking hardware to make it do something exciting and useful. Today systems integra-

tors are more likely folks who take standard hardware and then strap together lots of weird-looking software on top of it to do something exciting and useful.

Scratch the surface of some of HP's most successful software products, specifically NewWave, OpenView and SoftBench, and you will find what software developers call "framework products." I prefer to call them systems integration software. They simplify the task of integrating disparate pieces of software, often from multiple vendors, to get a job done. HP has a good start in this arena, and it is where much of the computer industry growth in the coming years will take place.

As a user you will find yourself caring less and less about hardware, and more and more about both the solutions that you are using, and the software framework upon which they function. The framework will define the degree to which your solutions are well integrated and how easy they are to use.

So keep an eye on that second chart to see where HP is really headed, the one that shows percentage of revenues from software and systems integration. That is the computer company of the future. Leavell says, "We have a hot hand in hardware today. But if our hand goes cold, we have the strength in the company to pick up the slack."

Sounds good. We'll be up here, watching. ■

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CIRCLE 196 ON READER CARD

ME10/ME30 Productivity Tools

Three new ME10/ME30 Add-on Utilities to Plot, Print, and View MI-format drawings more conveniently than ever before...

"PlotMI products are saving our CAD operators countless hours in plotting time... PlotMIView has allowed us to bring MI drawings to any PC. This is an extremely cost effective way to view drawings. PlotMIView is very beneficial when working at a remote site with laptop type computers."

-- Mark Rossi, Food Engineering Corp.

"PlotMI and PlotMIUtil are the key to our engineering drawing reprint system. This software works, it works fast, and is easy to implement!"

-- Karl Eliason, H-C Industries

"The Drafting department uses PlotMI and PlotMIUtil extensively to produce rapid A-size check plots on a LaserJet. This saves time and money because the plot is generated in the background, allowing our draftsmen to continue working, and the output is sent to an unattended device using cheap bond paper. PlotMIView provides our Quality Control inspectors with instant access to these latest drawings."

-- Richard Barnes, M/A-Com, Inc.

PlotMI™ prepares HP Model Interface (MI) files for plotting on HPGL compatible output devices without having to load ME10 or ME30:

- A single copy of PlotMI can serve the plotting needs of an entire site
- Supports all drawing features provided by ME10/ME30 software
- PlotMI runs *in the background*, does not tie up a workstation while plotting
- Provides advanced control over drawing content and page layout
- Layout multiple drawings on a single output page
- Plotting can be performed from any workstation or ASCII terminal
- Can batch process multiple drawings with a single command
- Works with the ME10 spooler and the lp spooler
- Produces long axis plots
- Customizable to use your plotter's special features
- Uses your own fonts as well as those supplied with ME10/ME30

PlotMIUtil™ prints ME10/ME30 MI files on any model HP LaserJet, PaintJet, and DeskJet printers, or on a Postscript-capable printer:

- A single copy of PlotMIUtil can serve the printing needs of an entire site
- Runs stand-alone, or seamlessly integrates into any PlotMI script, HP-UX shell script, or lp spooler script
- Compresses all output data for faster downloading and printing
- Prints drawings faster than pen plotters
- Drawings may be printed on A or B size media (LaserJet 2000, PaintJet XL and Postscript capable printers support the larger media size)
- Offers extensive user control over line style, pen color and pen width

PlotMIView™ displays ME10/ME30 MI files on the VGA, EGA, or CGA display of a personal computer, or on the graphic display of an HP 9000 Series workstation:

- Single keystrokes allow navigation, zooming, and panning
- Pan and zoom controls for observing finer drawing details
- WYSIWYG: drawings appear on the display exactly as they would if plotted on paper by PlotMI
- Extremely fast display
- Low cost PC hardware may be used for view-only work
- Runs on any PC compatible, and laptops for portable *in-the-field* viewing
- Supports a virtual memory feature for viewing extremely large drawings
- Custom batch files which allow seamless integration with networks automatically retrieve drawings from a central server for PC viewing
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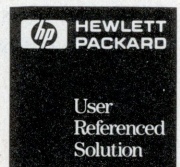
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Tymlabs Rolls Out New Products

Enters Joint Marketing Agreement With Collier-Jackson

Tymlabs Corp. (Austin, TX) released version 3.1 of its Formation forms-generation software for the HP 3000 and announced a joint marketing agreement with CompuServe/Collier-Jackson to sell Formation to Collier-Jackson users. In addition to the Formation news, Tymlabs also announced new MPE XL and MPE V releases of its BackPack tape backup software.

Formation 3.1 adds generation support for the new HP 5000 mainframe-class, high-speed printer to the

product's existing support for the HP 2680/88 printer and provides a migration path for users of HP's older laser printers. The new version also offers a post-processing tool that enables users to print output from any application on electronically generated, multipart forms.

The new release offers users support for the complete range of HP printers. Formation 3.1 also supports the most recent releases of MPE V and MPE XL. Pricing starts at \$3,600, depending on the size of your HP 3000.

Tymlabs also announced a joint marketing campaign with accounting software vendor Collier-Jackson. Under the agreement Collier-Jackson will market Formation 3.1 as a preferred forms generation solution to its HP 3000 installed base. Collier-Jackson's Gary Vigneau, vice president of sales and marketing, says, "Formation eliminates inventory, checks forms, requires less maintenance and is less costly for those customers who like the flexibility of creating their own pre-printed forms."

Tymlabs also released two new versions of its Backpack tape backup software for the HP 3000. The new releases, Backpack/XL version 2.8 for MPE XL and Backpack 2.7 for MPE V systems, reduce the time and personnel resources required to perform system backup. BackPack/XL now offers a high-density compression feature that allows one DAT cartridge to hold up to 5 GB of data.

Contact Tymlabs Corp., 811 Barton Springs Rd. Austin TX 78704; (512) 478-0611.

Circle 371 on reader card

IEM Announces New Storage And Backup Options

Recent Enhancements And New Systems In 8mm, Optical And DAT Technology

IEM Inc. announced enhancements and several new products including a 1 GB rewritable optical disk drive, a 5 GB 8mm tape drive, an 8mm 10-tape autfeeder, an HP-IB controller for HP's 4-drive library system, plus a "fast search" enhancement to their DAT drives.

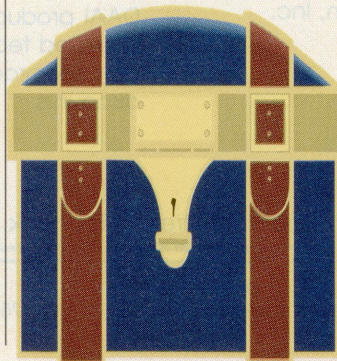
The IEM Model 5310 1.0 GB rewritable optical disk drive gives users online access to up to 1 GB of information

per optical disk cartridge (500 MB per side). Each side of a cartridge works as a separate hard disk, giving access to an unlimited number of functional hard drives.

The new 4850 5.0 GB 8mm tape drive provides users with unattended backup up to 5 GB, or 20 GB with data compression utilities. The 5 GB drive is fully compatible with 2.5 GB cartridges.

IEM's 8mm 10-tape auto-

feeders provide automatic, sequential loading and unloading of up to 10 8mm tape cartridges allowing nonstop, unattended backup, storing



up to 50 GB. The autfeeders are available with either a 2.5 GB drive or a 5.0 GB drive. Tapes are interchangeable between IEM's standalone drives and the autfeeder with the same capacity drive. The autfeeder with the 5 GB drive is fully compatible with 2.5 GB cartridges.

IEM's 6054 rewritable optical library system controller for use with HP's new C1704A and C1705A 4-drive rewritable optical library systems installs as five devices at



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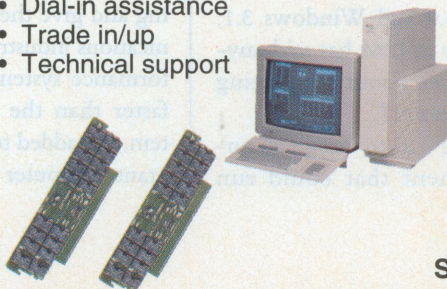
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five separate HP-IB addresses. Four CS-80 disk drives appear to the host when the 6054 is installed and are the actual magneto-optical disk drives that are part of the library system. Normal disk utilities and backup utilities function with these drives. The fifth device is a controller used for sending commands to the library system robotics. Users have the ability to write to and read from this device using

standard system read/write operations.

IEM's DAT drives now support fast search, allowing access to any file on a 1.3 GB tape in an average of 20 seconds. A new firmware release takes advantage of the fast search capabilities of HP's new C1501 DAT drivers. The IEM drives can also use HP's 7978 tape drivers. IEM's DAT uses the HP-standard Digital Data Storage (DDS) format.

IEM also offers 8mm Exabyte tape systems with capacities of 2.5 or 5 GB per cartridge.

The Model 5310 rewritable optical drive, the Model 4850 8mm drive, and the 8mm autoloader are compatible with HP 1000, 3000 and 9000 computers, are available with either an HP-IB or SCSI interface and use existing drivers. The Model 6054 controller, like the 6050 controller for HP's 2-drive library

systems, allows an optical disk library system using the SCSI interface to be connected to an HP 1000, 3000 or 9000 computer using the HP-IB interface, and existing drivers.

Contact IEM Inc., P.O. Box 1889, Fort Collins, CO 80522; (800) 321-4670.

Circle 370 on reader card

Microsoft And IBM Confront Operating System Battle

Popular Windows And OS/2 Programs Face Unsettling Divorce

Now that IBM and Microsoft have agreed that they can't agree on the next generation of x86 operating systems, the industry is preparing to cope with divergence. Here's the bad news:

Microsoft: Microsoft is about to release Windows 3.1, which improves upon the tools and techniques of 3.0 and includes an efficient new underpinning called OLE, an object-oriented technology that provides client-server applications services. For 1992, MS is nearing completion on Windows/NT (New Technology), a 32-bit asynch, multithreaded system that has been almost three years in kernel development. For now, there's Windows 32, a 32-bit extension of the 3.0 API. "With NT, our goal is to build an operating system that is 32-bit from the ground up," said Jonathan Lazarus, Microsoft's GM of software marketing, at the Windows & OS/2 conference. "We will accommodate existing applications and provide a base for new applications."

"NT looks exactly like 3.1

but is fully pre-emptive and multitasking," he explained. "3.1 and NT will both evolve with similar extensions."

With NT, Microsoft will support not only IBM's OS/2 1.3 and 2.0 APIs, but MS/LAN Manager. After 1993, it is expected to migrate all of its users to NT, which will include a new mode of operation that will address the RISC-based ACE workstation-server environment. The NT development kit is expected in a few months.

IBM: The vision plan for OS/2 2.0, due out later this year, is to run DOS, Windows, and 16/32-bit OS/2 applications concurrently. 2.0 also will have a new graphical environment for use on 32-bit workstations.

The pitch is that will it provide better DOS than DOS and better Windows than Windows. That means it will integrate with 16-bit Windows 3.0 and Windows 3.1; nobody at IBM has said anything yet about supporting Windows NT.

"We had to design an environment that could run

these existing applications better than the existing operating systems," said John Soyryng, the director of IBM's Personal Systems line of business software development.

Epilogue: Windows is hot and OS/2 is not. More than 4 million Windows copies have been sold since May 1990, and more than 65,000 development kits. It has been estimated that the installed base of PC users with Windows will reach 12 million by 1993. MS says Windows has surpassed the Macintosh in

terms of software sales. To add insult to injury, even DOS 5.0 sold a million copies in its first month.

The popularity of the programs is exactly what makes the divorce so unsettling. If people didn't like the technology they wouldn't be buying it. Many users, developers and network managers are relying on interoperability between the two environments, yet it's not going to happen.—*Evan Birkhead, Contributing Editor*

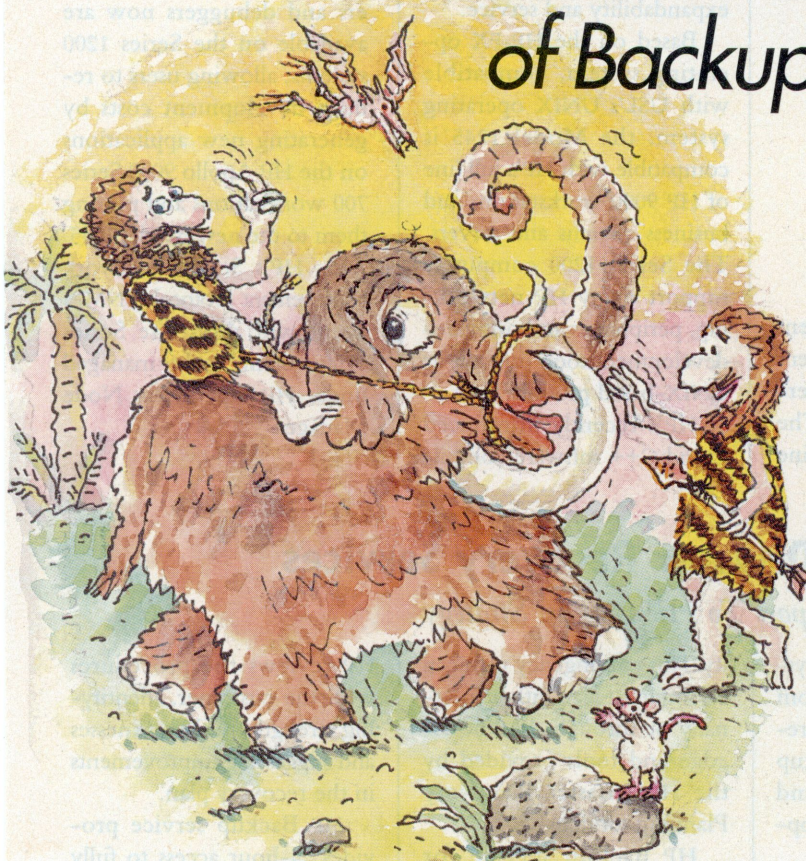
HP Introduces Fault-Tolerant UNIX-Based Computer

HP 9000 Model 1245 Provides Telecommunications Industry With High-Performance System

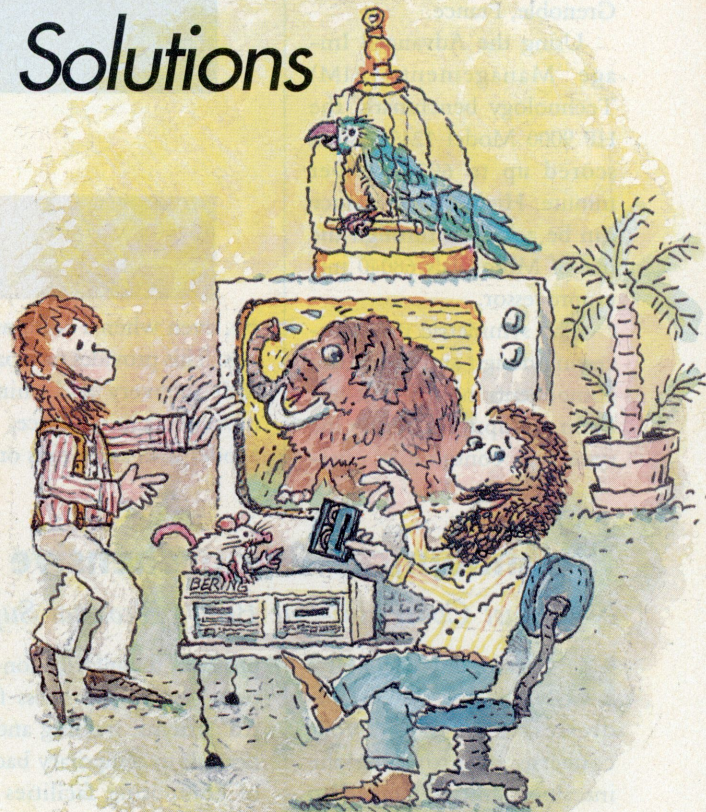
In an effort to provide an open-systems environment for online transaction processing and give the telecommunications industry a high-performance system three times faster than the existing system, HP added to its fault-tolerant computer offerings the

new UNIX-system-based HP 9000 Model 1245. HP also announced the list price for the existing HP 9000 Model 1240 will be reduced by 40 percent and HP fault-tolerant systems can be ordered in Europe through a new marketing and sales operation established in

Natural Evolution of Backup Solutions



Eeeeeek! Trying to backup a mammoth database used to be a task of historic proportions.

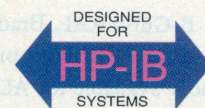


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ECHO 4900 Series

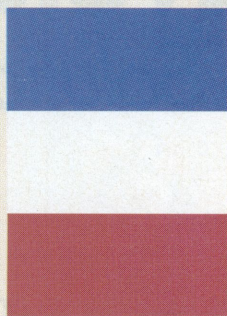
High Capacity Streaming Tape Backup Solutions
for Hewlett-Packard Computers

CIRCLE 105 ON READER CARD

Grenoble, France.

Using the Advanced Image Management (AIM) Technology benchmark, the HP 9000 Model 1245 system scored up to 603 jobs per minute. Higher performance can be achieved through the use of Motorola's 68040 microprocessor.

The symmetric multiprocessing design and redundant components in HP's fault-tolerant computers allow the system to continue to oper-



ate, even when a component fails. This provides transparent fault recovery and uninterrupted online service. The Model 1245 also offers online

expandability and service.

Based on the HP-FX operating system, compatible with USL's UNIX operating system, the Model 1245 is compatible with HP's full line of HP 9000 workstations and business systems and servers. The Series 1200 computers support many HP networking, peripherals and software-development tools used on its UNIX-based product lines.

HP's recently introduced C and C++ software compil-

ers and debuggers now are available on the Series 1200 systems, allowing users to reduce development costs by generating new applications on the HP Apollo 9000 Series 700 workstations and porting them to the new Model 1245. Also, HP's Simple Network Management Protocol (SNMP) agent will allow the Series 1200 systems to be managed under HP OpenView Node Manager.

HP Announces Comprehensive Disaster Recovery Services

New East Coast Hot-Site Brings Bicoastal Support To HP Backup Strategy

HP Backup service for HP's UNIX-based systems addresses disaster recovery concerns by providing the interim facilities needed to conduct critical business functions while repairs are in progress.

With this announcement HP is offering comprehensive disaster-recovery services for the company's UNIX-based computer systems covering all

phases of the information-systems recovery process from risk analysis, training and rehearsals to temporary backup of computing facilities and restoration of computer operations.

HP Backup service requires that each customer have a comprehensive disaster-contingency plan for use in full-scale recovery rehearsals at an HP recovery facil-

ity. This contingency plan can be implemented either internally or through the knowledge and tools provided by the HP Disaster Recovery Planning service.

HP Backup service for HP's UNIX-based systems include up to six working days (48 hours) per year at an HP hot-site facility to rehearse customized recovery procedures. After each rehearsal,

HP reviews the procedures with the customer, identifying strengths and weaknesses and suggesting improvements in the recovery plan.

HP Backup service provides 24-hour access to fully operational configurations including systems running MPE V, MPE XL and HP-UX. In conjunction with new service, HP opened a new hot-site in Valley Forge, PA.

Bradmark Adds To Its IMAGE

Shipping DB-GENERAL Now Available For ALLBASE

DB-GENERAL, Bradmark's database utilities product, is now available for ALLBASE as well as IMAGE, and the company is planning on moving into HP-UX as well.

Taking the toil and trouble out of living with HP's IMAGE database has been the forte of Bradmark Technologies Inc. (Houston, TX) for more than a decade. But growing customer interest in HP ALLBASE and HP-

UX has gotten the company's attention.

"We are moving to ALLBASE because we have a lot of customers all over the world, major customers, who are looking at ALLBASE," says Denys Beauchemin, DB-GENERAL R&D product manager. "A lot of people are feeling out the relational environment. The demand is there, we expect it to increase, and we want to be

ready."

Beauchemin also says that, although customer interest is moving toward HP-UX, the market for MPE XL products remains healthy. "It keeps expanding. We thought it would shrink, but it is growing, just not as fast as HP-UX." He reports that Bradmark will introduce something for HP-UX "some time in 1992 at the latest."

Beauchemin reports that

HP-UX is expanding more rapidly in Europe than in the U.S., and that on both sides of the Atlantic, customers are tending to add HP-UX systems while keeping MPE V and MPE XL.

DB-GENERAL helps database managers with tasks such as managing database capacity, reorganizing data sets, changing structures, copying and erasing, indexing and index and table changes.

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Plus it's a simple upgrade for the best tape drive built: our CY-8200. Offering a complete range of standard



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CIRCLE 112 ON READER CARD

HP Workstations: Try The Hardware Isle

HP Expands 700 Series Distribution To PC Clientele

Series 700 RISC workstations are joining HP's PCs and peripherals in expanding into distribution channels beyond the HP direct sales force. HP has announced its Certified Workstation Reseller (CWR) program, which

will enlist at least 100 dealers around the U.S. to sell Series 700 workstations to small and medium-sized customers who aren't using complex client-server systems.

HP reports that the program will include "about

two" large franchised dealer chains, as well as some independent dealers. Each dealer will meet stringent HP requirements for quality of support and service and in return receive substantial support from HP.

Products included in the CWR program include all HP 9000 Series 700 products, including Models 720, 730 and 750, as well as Series 700/RX X terminals, graphics products and software.—*Bill Sharp, Technical Editor*

International Insights

VisionWare Sets Sights On U.S. Market

DOS To Host Integration Products Create Invisible Links To Multiple Environments

Seemingly unaffected by the worldwide recession, VisionWare Ltd. (Leeds, England) a developer and marketer of PC/host integration software announced a 15.8 percent net profit for the financial year 1990-91. After just two years in the market, VisionWare has positioned itself in the distributed computing arena by offering MS Windows users a familiar interface to UNIX and the X Window System.

Since its management buy-out from Systime Computing Ltd. in 1989, VisionWare's stronghold has been the success of its 23 distributors in the United Kingdom, Canada, the United States, New Zealand, Australia and South Africa.

One fourth of the company's revenues have been generated from exports to the U.S. alone, and according to Nicola Richardson, director of marketing, immediate efforts will be to support the U.S. distributors and their clients. "We will concentrate on supplying technical support, toll-free numbers and establishing relationships with

networking-oriented companies. It's important that our U.S. clients have easy accessibility to support without the inconvenience of the overseas time difference," explains Richardson.

VisionWare's product line supports true integration for distributed environments for users of MS-Windows, PC and host systems by offering the ability to share data, applications and resources using one interface and without excess hardware.

PC-Connect, VisionWare's flagship product, integrates UNIX and other host systems

with Microsoft Windows by allowing multiple UNIX applications to display unchanged and simultaneously with local programs.

"From the outset we wanted to get involved in UNIX," explains Richardson. "We understood that UNIX was cumbersome to learn and slow in acceptance, yet we wanted PC users to take advantage of the multitasking benefits of UNIX, but with the ease and familiarity of DOS commands."

SQL-Retriever is a database add-on product that allows any Dynamic Data Ex-

change (DDE) supporting MS-Windows Applications to make SQL-queries into host-based UNIX databases such as ASK/Ingres, Oracle or Informix.

X Vision allows multiple X applications resident on HP-UX and other host systems to be displayed at the same time as Windows programs using copy and paste facilities. —*Andrea Zavod, Associate Editor*

Contact VisionWare Ltd., 57 Cardigan Ln., Leeds, LS4 2LE, United Kingdom; 44 532 788858.

Circle 374 on reader card

Group 1 Software Appoints Swedish Distributor

Mail Management And Marketing Support Expands To Norwegian Countries

Group 1 Software appointed Cortex Konsultkollegium AB of Helsingborg, Sweden as the exclusive distributor for Group 1 products in Denmark, Sweden, Finland and Norway. Cortex develops custom software for the international direct marketing industry, with systems designed for marketing, ful-

fillment and facility management. Initially, Cortex will distribute Group 1's EZ-LETTER Batch, EZ-LETTER On-Line (formerly LETTER LINK), and Business Merge/Purge systems for mainframe computer platforms.

Group 1 software provides mainframe, midrange and microcomputer software to the

marketing and mail management industry. The company offers a range of software products and professional services including list management, postal discount, mail personalization, demographic and database marketing.

Contact Group 1 Software, Washington Capital Office Park, 6404 Ivy Lane, Ste. 500, Greenbelt, MD 20770; (301) 982-2000.

Circle 375 on reader card

Bring Your Macs into the UNIX World.

Now Macintosh users can access all the applications, files and processing power of a UNIX server – at the touch of a mouse. With unsurpassed terminal emulation and file sharing capabilities, Pacer spans the entire UNIX universe. To learn more about Pacer software, call 619-454-0565 (in the west) or 508-898-3300 (in the east). And get the best of both worlds.

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Worldwide Support.

Pacer's customer service staff now provides support to over 4,000 sites.

AppleTalk Services. PacerShare and PacerPrint provide AppleShare-compatible file serving and print services. All built on Apple's portable AppleTalk – co-developed by Pacer.

High Performance.

Pacer's software takes advantage of advanced hardware platforms: Intel, Motorola, and RISC (MIPS, SPARC).

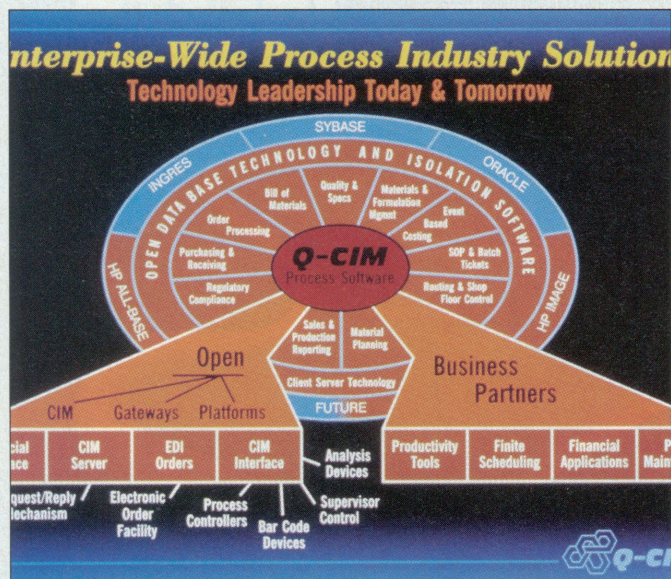
Multiple Platforms.

HP, Sun, DEC (VMS, ULTRIX), DG, NCR, SCO, ISC, MIPS and others.

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When you think about manufacturing, do you think about assembly lines, where the same parts get attached to the same parts to produce the same product after the same product? It's like following the directions on a storage box. No matter how many times you flounder, folding flap A into flap B still builds a storage box. Although it can always be made more efficient, this kind of repetitious, assembly work, or "parts" orientation, better known as discrete manufacturing, can be relatively easy to manage.

If, however, you're manufacturing paper or paint or some other product that involves a chemical process, monitoring and managing it can be more complex. For instance, you may need different raw materials for each batch, depending on the weight, color, etc., of the material you're attempting to produce. In this kind of pro-

cess environment, you need the flexibility to mix various components to reach the desired output.

The Flexibility Factor

Q-CIM Inc. (Princeton, NJ) realized that process manufacturers needed to have decision making flexibility at the plant level, so its operators can maintain batch and continuous flow operations. Its product, Q-CIM, is a process industry software system that allows local or remote management of processing plant functions on an enterprise-wide basis. Q-CIM lets manufacturers make decisions with an adaptable "recipe" formula, something shrink-wrapped solutions don't provide.

Available for the HP 3000 running MPE XL (HP-UX version coming soon), Q-CIM also supports multisite operations of networked minicomputers and allows access to PC users. The system is designed to provide plant operators the ability to use information from IMAGE databases in coordination with online subsystems to monitor and control plant operations, ensuring that products are manufactured and shipped according to specifications.

The core of the Q-CIM system is the company's formal business alliance that allows for subsystem integration of the accounting systems of Collier-Jackson, the plant and equipment maintenance systems of Revere Technology and the finite

scheduling, capacity requirements planning system of Scheduling Technology.

Q-CIM also provides full lot traceability (forward and backward) from the time raw materials are received, through all steps of the production, shipment and distribution processes.

Most process manufacturing plants have unique environments where product lines, materials management and production planning all vary. For this reason, Q-CIM is flexible, allowing users to "program" online the special requirements as they are encountered.

"With Q-CIM, the user has ownership of the software," says Wayne Wasylyk, president. "He can customize the application based on specific criteria imposed by environmental policies, customer requirements or economic conditions, without reprogramming applications. Q-CIM is a user oriented system that doesn't require a technical staff. It puts control of the factory floor in the hands of the plant operators."

Future releases planned include relational database technology, enterprise-wide activities based costing and OSF/1 versions.—*Andrea Zavod, Associate Editor*

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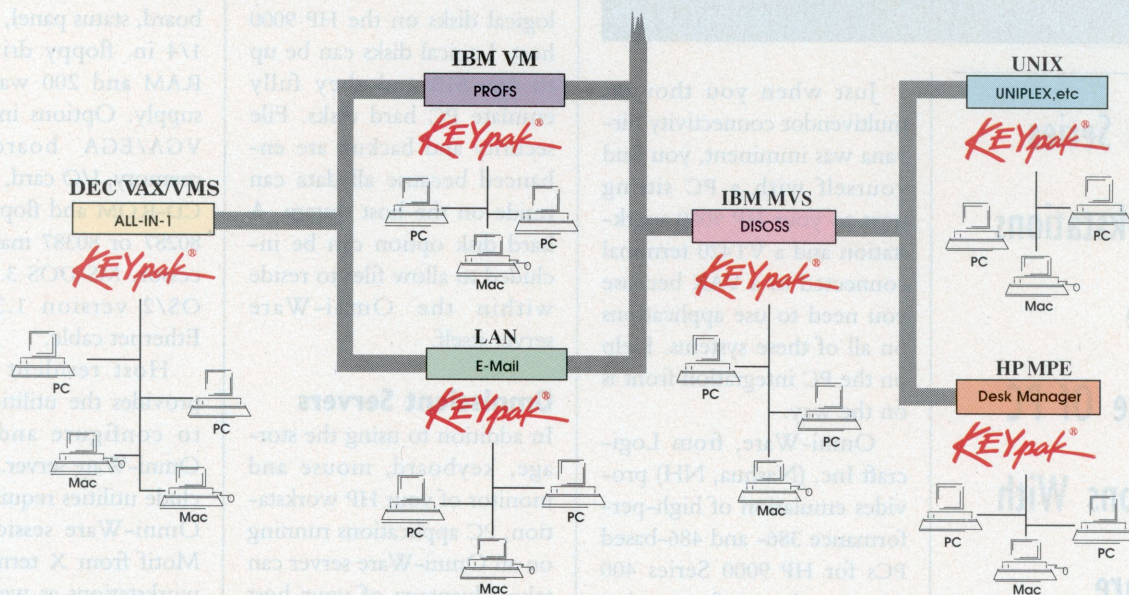
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Advantage Of PC
Applications With
Omni-Ware**

Just when you thought multivendor connectivity nirvana was imminent, you find yourself with a PC sitting next to your HP 9000 workstation and a VT420 terminal connected to a VAX because you need to use applications on all of these systems. Help on the PC integration front is on the way.

Omni-Ware, from Logicaft Inc. (Nashua, NH) provides emulation of high-performance 386- and 486-based PCs for HP 9000 Series 400 systems. Any software that runs under OS/2, MS-DOS, SCO Unix or Microsoft Windows will be accessible from your HP workstation. DOS applications are run on the Omni-Ware server while your HP workstation provides the keyboard, mouse, monitor and storage.

DOS sessions are started on the server through a Motif window. PC applications run-

ning on the Omni-Ware server can be viewed in one window while other activities take place on the HP 9000 workstation. Data can be cut and pasted between the DOS application window and other windows.

Special drivers are provided for use with Microsoft Windows 3.0. These drivers allow you to take full advantage of your workstation's graphics capabilities and your monitor's real estate.

PC software and data are stored in "containers" or logical disks on the HP 9000 host. Logical disks can be up to 480 MB and they fully emulate PC hard disks. File security and backup are enhanced because all data can reside on the host system. A hard disk option can be included to allow files to reside within the Omni-Ware server itself.

Omniscient Servers

In addition to using the storage, keyboard, mouse and monitor of your HP workstation, PC applications running on an Omni-Ware server can take advantage of your host system's printers. Emulation of a PC's LPT parallel printer ports allows you to send PC application based output to printers attached to your HP 9000 workstation.

Board level Omni-Ware servers consist of a coprocessor board that you install in your own 100 percent AT-compatible microcomputer. A daughter board with the

desired interface (Ethernet or SCSI) attaches to the coprocessor board. The standard product emulates a Hercules graphics controller, parallel printer port, hard disk controller and the PC keyboard. A VGA/EGA board supporting up to 256 colors, MS-DOS (version 3.3 or 4.01), OS/2 (version 1.3) and an Ethernet cable are optional.

The System Level unit comes complete with a cabinet containing an 80286, 80386 or 80486 processor, COP, interface daughter board, status panel, 1.2 MB 5-1/4 in. floppy drive, 1 MB RAM and 200 watt power supply. Options include the VGA/EGA board, more memory, I/O card, hard disk, CD-ROM and floppy drives, 80287 or 80387 math coprocessor, MS-DOS 3.3 or 4.01, OS/2 version 1.3 and an Ethernet cable.

Host resident software provides the utilities needed to configure and use the Omni-Ware server. These include utilities required to run Omni-Ware sessions under Motif from X terminals and workstations as well as utilities to allow use of standard ANSI terminals.

Omni-Ware servers start at \$1,495 for the board level product and \$3,495 for a base standalone system. — David Miller, Senior Technical Editor

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TALE of TWO FORMS



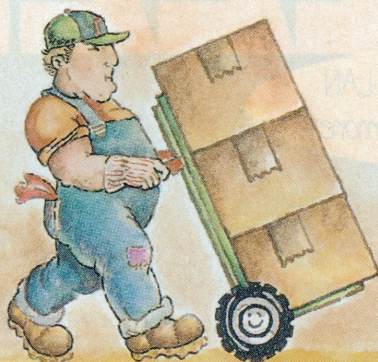
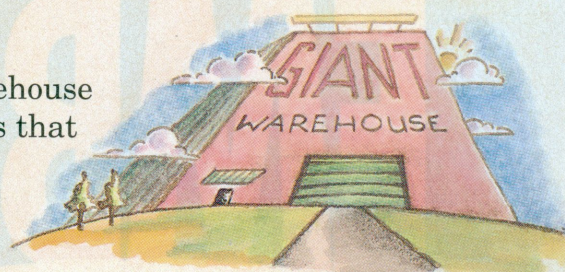
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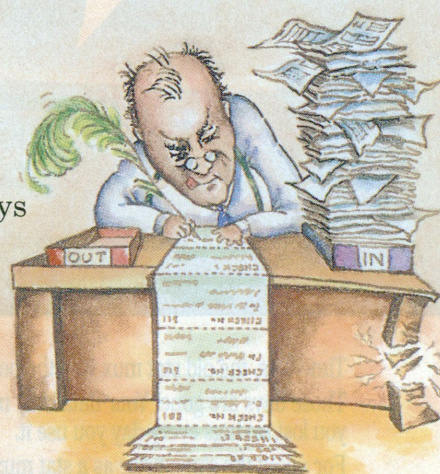
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while you wait for the forms
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This is your 2^{big} warehouse
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This is the 2^{many} trips lugging around
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CIRCLE 243 ON READER CARD

Zen

M a s t e

By Bill Sharp

Product design engineers aren't often inscrutable, but it seems to happen rather more often these days. You call an engineer to talk about design for manufacturability, a nice, ordinary dweeby-techy topic. You expect numbers, data, reduced-mean-time-between-failure talk and that sort of thing. What do you get? You get philosophy, and not just ordinary philosophy, but inscrutable philosophy. "The key is the philosophy," says Bob Boeller of HP's San Diego Technical Graphics Division, giving the whole thing away at the start. Then he plunges headfirst into inscrutability. "We don't design a product. We design the documentation and the processes that are used to build the product." This deserves closer scrutiny. I fire up my incense burner, pull a muscle attempting to assume the lotus position and try to make sense of it all.

What is taking place in the world of product design is a lot more experimentation based on the newest and most powerful design tools available. This includes new ways of thinking about

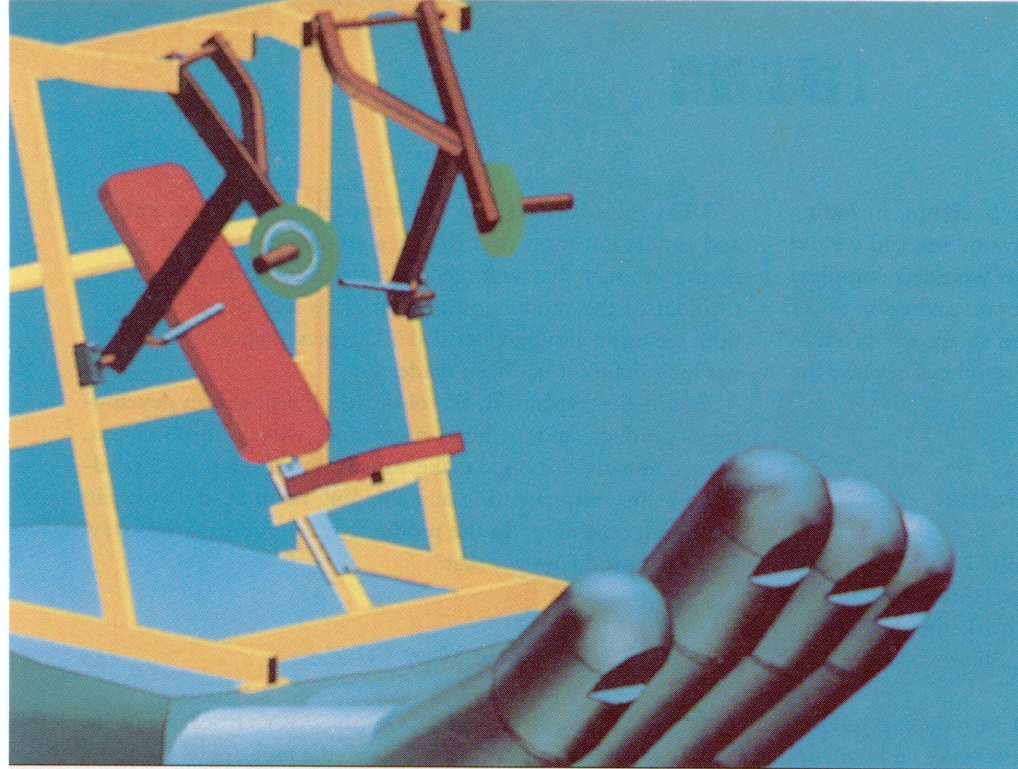
the design and manufacturing processes, and tools such as mechanical engineering design workstations teamed up with solids modeling and finite element analysis software.

These tools are wielded in different ways by different groups of people with much the same goals in mind: Focus tightly on the needs of the target customer and design the product with production processes in mind. While in each case the pathways, markets and particular results are different, many elements of the thought process are the same.

Five months after we moved into an empty building we delivered our first product," says Gary A. Jones, co-founder and director of manufacturing engineering for Hammer Strength, Cincinnati, Ohio. "For the next 14 months, we developed one new product every two weeks with an average staff of 14 people."

Hammer Strength makes body-building machines that sell at much lower prices than models from the traditional leader in the market. All products are designed start to finish with solids modeling techniques. Jones' products use a dramatically reduced





rs

parts inventory compared to those from the competition. His design philosophy is less complex than that used in San Diego, but it works for him: "Simplify, simplify, simplify," he says.

"In some cases we have reduced design time by at least 50 percent, and we are just getting started," says Michael Buzzell, drafting manager for M/A COM's Control Components Division, Merrimack, NH. Buzzell's firm makes microwave communications components for satellites and other systems.

Faced with the need to provide customers with better-designed products in less time and at lower cost, M/A COM developed an extensive computer network that ties solids modeling design stations to parts databases, the machine shop and MRP systems. They have earned a reputation as a company to turn to when other firms just cannot get the job done.

"This product has gone much smoother. We are building more units in less time, and we don't expect any availability problems at introduction," says Boeller. He has been watching the production ramp-up for his division's first product to use a new philosophical approach to product design.

HP's

Inscrutable Design

Philosophy

Follows

The Tao

Of Manufacturability

"This is a new product and a new architecture, including new firmware and subsystems from the ground up, and we did it in less time than with other systems that were less complex. We expect that we will have even greater cost savings in fewer people needed to support production, less scrap, less production line downtime and better use of our resources because the process is more predictable."

The Rules Of The Game

DESIGN FOR MANUFACTURABILITY (DFM for you acronym-lovers) breaks down into three components according to Bob Hills, product marketing manager for HP's Mechanical Design Division, Fort Collins, CO.: philosophy, practice and tools.

DFM philosophy includes topics such as reducing time to market, removing barriers to improving processes and concurrent engineering to allow more than one part of the product development process to move ahead at the same time.

DFM practice focuses on techniques to improve the ease of assembling the product, particularly concepts such as rule-based design, which prevent designers from using ideas that will make assembly more difficult or costly.

DFM tools include 3-D solids modeling as well as analysis and simulation tools to arrive at a complete computer model of the product that will feed essential information to the remainder of the production process. This also allows visualization, seeing an accurate, detailed 3-D representation of the product long before it has been made.

As Boeller explains it, the old method focused on developing a product, and, as he is more than willing to point out, your company does not make money by developing a product, but by manufacturing and shipping them at low cost and with high reliability. So the product, in a perverse sort of way, is not the product—got that?

The Way Of Zen

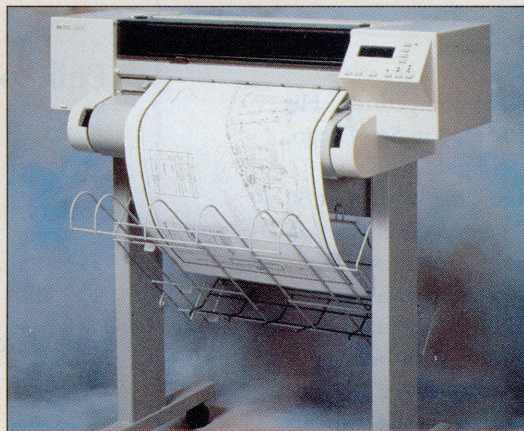
TO DEAL WITH THIS QUANDARY, Boeller and his cohorts in San Diego imported a philosophy from the Far East, with a suitable inscrutable name: Quality Function Deployment (QFD). You know right away just from the sound of that name exactly what it means, don't you? . . . Well, neither did I.

In fact, QFD is a Japanese methodology for developing products by tying each step in the process back to the needs of the

[HP DESIGNJET: THE PROOF IS IN THE PLOTTER]

It's not true that HP developed its new DesignJet monochrome inkjet plotter to punctuate the points made in the accompanying article—the product's timing is just coincidence. However, it is true that when Bob Boeller, Development Lab Program Manager at the San Diego Technical Graphics Division, talks about using a new product development philosophy, he is talking about the DesignJet program. And inscrutable or not, it seems to have worked.

The product is the HP DesignJet, a monochrome, large-format plotter that uses the same inkjet technology as the three million or so HP DeskJet plotters humming along out there. While the new plotter will not produce color, it will produce results a great deal more rapidly than pen plotters. A 300-dpi E-size plot takes less than six minutes, compared to up to 45 minutes for a pen plotter. And the price is nice, at \$10,995.



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intended customer. Because the name is a translation from Japanese, it evidently makes little sense in English and might as well stand for Queensland Fire Department. Just think of it as a design for manufacturability philosophy.

"It forces you right from the very beginning to think about the production line, the vendor base and the documentation process," says Boeller. "When we staff up, we include not only the marketing technologists, but also metals and plastics people as part of the architecture team to ensure that the design is consistent with the vendor base and the capabilities of our assembly process."

In the old days, design engineers used to sit around having brilliant ideas about new products and twiddling with things until something worked. They then drew up the brilliant concept on paper and handed THE DESIGN over to the manufacturing team. The manufacturing team then would stand around looking at THE DESIGN, scratching their heads (they generally had large bald spots) and trying to tweak the twiddlings so that the product would be at least moderately manufacturable at a bearable price.

Now, rather than two consecutive processes, there is at least in theory one concurrent one. Design engineers now sit around having brilliant ideas and twiddling with things, but the things tend to be on the screen of a computer. Manufacturing folks are now an integral part of the team, so they can be looking over the shoulder of the design engineer, murmuring comments, scratching their heads and tweaking at the very same time that the design engineer is twiddling, which saves tremendous amounts of time.

Thought Into Practice

SIMPLIFYING PARTS AND THE assembly of those parts is essential to the practice of DFM, and need not look awesomely high-tech in its implementation to be effective. When Hammer Strength employees work to complete a body-building machine for shipment, it looks simple. The reason it looks so simple is that Jones and his designers have spent many hours designing the products to make them simple.

Jones compares parts counts with a major competitor as an illustration of how he has changed the product design. "We use only two sizes of bearings instead of the more than 30 they use," he says. "We use 19 different steel shapes instead of their more than 100. I can put my entire parts inventory on one sheet of legal paper instead of a huge computer printout." Hammer Strength uses 32 different pad designs for contact points between the user and the various machines. The competitor, for upholstery and pads alone, has "an entire catalog."

When a product is designed at M/A COM, a routine part of the process is a query of HP DMS for previously designed parts or portions of parts that can be used again. "An engineer can use the database to pick existing parts that are more cost effective to use," says Buzzell. "Then an existing part may be modified in software to quickly complete the design. You can ask for a 4 by 4 plate with a hole at location Q and DMS will find it if it exists." And if it does exist, manufacturability and vendor supply has already been worked out in the past, assuring faster completion of the project. Needless to say, this is a well-used capability.

The Master Model

A KEY TO GETTING THE most out of DFM is making good use of solids modeling capabilities. This computer-based design system allows the engineer to completely model the parts and functionality of a product, and provide the information to ease the transition to production. "Today you use solids modeling to define the product completely, and that information is robust enough to survive the transition to production," says HP's Hills. This detailed, computer-generated representation of the product is called the master model.

Many of these design tools will not allow the user to define a part that cannot be manufactured. Using rule-based design concepts, the software could tell the designer whenever a design change is something that cannot be physically done, or strays outside an approved set of parts or production processes. These capabilities are relatively new but will become much more common, says Hills.

Visualization takes the product design and renders it in a form that is easily understood not only by the designer, but by non-technical people as well. "One of the guys in San Diego say it used to take two to three days for production engineers to figure out how to do some machining because they had to imagine the whole thing from drawings," says Hills. Visualization allows the same people to almost instantly recognize the part, how it functions and how it can be produced.

"We try to use computerized tools to expedite our cycle time," says Buzzell at M/A COM. "When an engineer comes in with a concept, we model it using solids, work out the particulars from a mechanical standpoint and use our microwave software to model the electrical performance. At this point, we haven't even cut any metal and already we are doing things that used to require revving up the machine shop and building models."

At One With The Design

BUT THEY'RE NOT finished yet. They examine the solids model using visualization and then use a CAM package to determine if the design meets shop standards, what the cycle time is to produce one and its cost. The results of this analysis are fed back to the design engineer who will make necessary changes. "This is all done with comput-

ers—no scrap, no materials, just the labor to develop the design,” says Buzzell.

For Hammer Strength's body building equipment, the tie-back to the user was much more direct—they made a solids model based on one of them, and now build every new product around this program, called Reggie. Reggie is in fact a 3-D solids model of ex-Cincinnati Bengal Reggie Williams.

“We have the natural motion of the body with joint alignments simulated on the screen of our ME30 by Reggie,” says Jones. “Reggie the program can do anything a human can do, so we design our machines to follow those joints and alignments, the natural lines of the body's movement. Without the computer visualization of something like the ME30 you just couldn't do it.”

Every tool in the factory is programmed into the design process at Hammer Strength. Standardized parts, assembly tooling and processing all are part of the design, making it much easier and less expensive to manufacture the products.

Jones has enjoyed an ease of implementing new designs that is not often available to companies. Because Hammer Strength started as a new company, with no previous designs to support, it had a clean slate. More typical of the design problems faced in industry today is the experience at M/A COM, where

designs will move over to the new systems a bit at a time, gradually converting the company to increased capabilities.

The Constancy Of Change

AS THE SYSTEMS CHANGE, so must the people. Making the switch to developing mechanical designs directly in 3-D solids modeling software is quite an adjustment for most users. “2-D CAD replaces the drafting board almost directly, and immediately,” says HP's Hills. This took a lot of the pain out of the transition to 2-D CAD for most users. But 3-D solids modeling design using the master model concept “means you have to rethink the whole design process,” he says. And its use is quickly becoming pervasive. Some designs, notes Hills, may not be documented in 2-D at all, but done entirely in 3-D.

Such broad-ranging changes on the design scene are enough to make an engineer resort to almost anything—even inscrutable philosophy.

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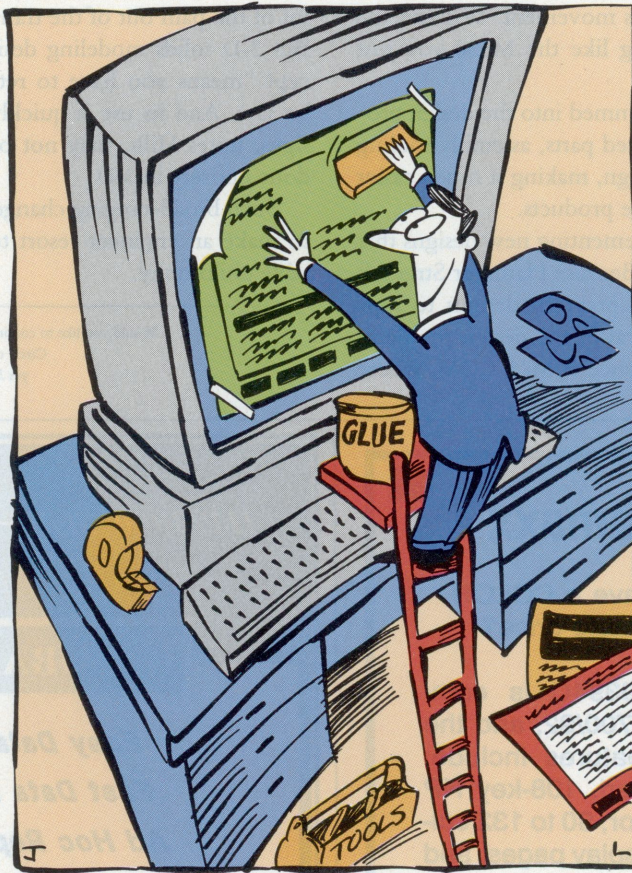
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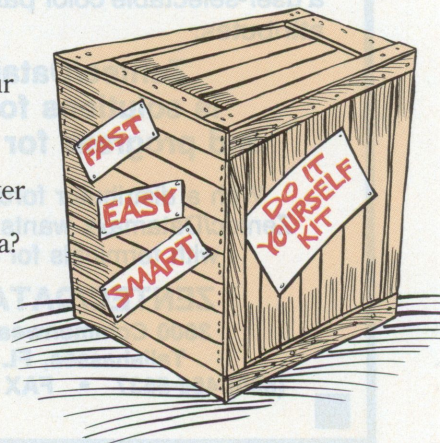
What if you could remodel your existing applications overnight to add PC-like retrieval windows and hot-key task switching on standard HP terminals? What if you could add incredibly fast on-line reporting in 30 minutes or less? What if you could customize command and help menus for your users in less than an hour? And what if you could do it all without taking a big bite out of your DP budget?



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OMNIDEX On-Line combines the keyword retrieval power of OMNIDEX with the PC-like windows of OmniWindow and the instant reporting of OmniQuest to deliver a complete application make-over kit that can be installed in a morning. No hand tools or programming changes required.

Step One: Look at your databases. Which ones need better access or faster reporting? Customer data? Inventory? Accounts receivable? Orders? Vendors?

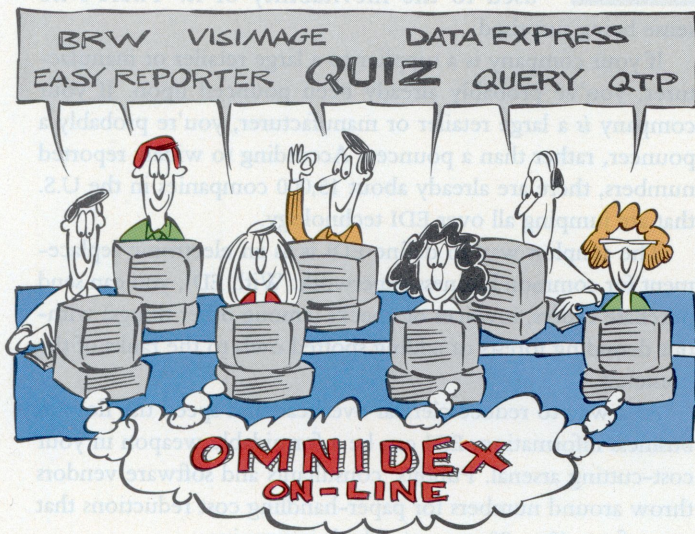


Step Two: How do your users want to look up data? By name? Company? Address? Transaction amount? Date? Index these fields with OMNIDEX and records can be instantly retrieved by any combination of words or values contained in those fields.

Step Three: OmniWindow will now build retrieval windows for each database you've indexed. If you wish, you can quickly customize the retrieval windows to meet the needs of specific applications and users. You can also use OmniWindow to create customized help screens.

Step Four: List the various programs and screens that your users access frequently. Add them to the Task Manager window and let your users hot-key between screens and applications with a single key stroke.

Step Five: What report writers do you use? QUIZ? BRW? Inquizitive? Query? Add OmniQuest for incredibly fast record selection and true on-line reporting with your existing report writer. If you're using Easy Reporter, Data Express or Visimage, simply hook up their OMNIDEX interface and you're on your way.



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CIRCLE 113 ON READER CARD

An

Exercise

In EDI

BY GORDON MCLACHLAN

A Cake Walk For Large

Retailers, Electronic

Data Interchange Can

Be A Strenuous

Workout For Small

Suppliers

Every once in a while I'll be walking through my house and suddenly see a fuzzy blur and find a cat attached to my leg. EDI is like that: It's one of those technologies that sneaks up on you and then pounces. You may as well get used to the inevitability of it. There's no sense being surprised.

If your company is a supplier to a large retailer or manufacturer, you've probably already been pounced upon. If your company is a large retailer or manufacturer, you're probably a pouncer, rather than a pouncee. According to widely reported numbers, there are already about 15,000 companies in the U.S. that are jumping all over EDI technology.

The simplest way to define EDI is as an electronic replacement for common business paperwork. With EDI, you can send purchase orders, invoices or checks (among other things) without denuding forests or adding spotted owls to the ranks of the homeless.

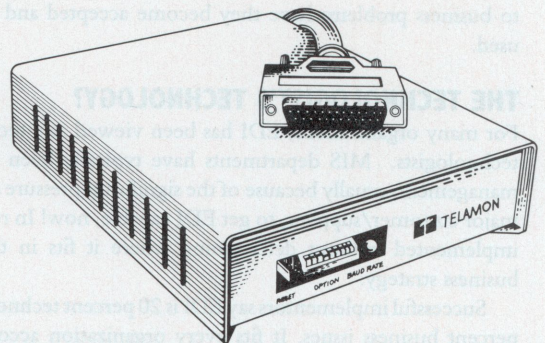
As a way to reduce clerical overhead and speed the flow of business information, EDI can be a formidable weapon in your cost-cutting arsenal. Pundits, consultants and software vendors throw around numbers for paper-handling cost reductions that range from 40 to 90 percent. That's impressive.

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- POS Device Polling
- ATM Polling



Much of the world relies on bisync protocols of one form or another. EDI VANs like GEISCO and trading hosts like K-Mart, Wal-Mart, JC Penney, GM, Sears, and many others specify 2780/3780 as their primary interface. IBM, NCR, Fujitsu and other ATM and POS devices speak bisync. Telamon has linked HP 3000 and HP 9000 systems to these systems and devices all over the world.

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CIRCLE 142 ON READER CARD

Being a natural-born cynic, I always look for the cloud around the silver lining. When consultants prance in like Richard Simmons yelling "let's move it, fat girls" I know that I'm going to be doing some sweating before losing that ugly fat.

My first exposure to EDI came in 1984, when I had a real job with a company that made round metal things for the automotives and other manufacturers. One day, while blithely going about doing the things that MIS folks do, we got a visit

[FACT OR FANTASY: EDI FOR THE '90s]

Some of you may have heard a lot about Electronic Data Interchange (EDI), for quite some time. ANSI X12 and its predecessors have been developing EDI standards since the early '70s.

Twenty years? What's going on? For some, the EDI bug has not yet bitten, for others it's a requirement of your industry. Talking with business people, MIS professionals and consultants about EDI viability, you hear wide variety of comments. These range from "... EDI being a dead technology, only large companies can understand and benefit from..." to "... EDI's potential impact (benefit) to business will far exceed that of the personal computer." Confusing, right?

Few times in history has a technology emerged and been accepted by the masses quickly. The business world moves on a steady path without radical deviations. Business managers continuously evaluate hundreds of new technology tools that may change that path.

Technologies such as UNIX-based computing or bar-coding have similarities with EDI in their acceptance. Each has been around for more than 20 years. But, not until their introduction as solutions to business problems have they become accepted and successfully used.

THE TECHNOLOGIST'S TECHNOLOGY?

For many organizations, EDI has been viewed as a technology by technologists. MIS departments have typically been directed by management, usually because of the significant pressure applied by a major customer/supplier, to get EDI capable, now! In reaction, it is implemented without determining where it fits in their overall business strategy.

Successful implementors say EDI is 20 percent technology and 80 percent business issues. It fits every organization according to its needs, potentially being used in all functional areas and requiring stronger business relationships with trading partners.

Does EDI make sound business sense? Let's look at some of the factors affecting EDI acceptance:

■ **Usage**—In 1990 approximately 60 percent of the U.S. Fortune 500 companies have EDI programs in place or planned. Over 15,000 U.S. organizations are using EDI today, and many thousand more internationally. EDI use is growing 20 to 40 percent annually in virtually all industry sectors.

■ **Economic benefits**—Organizations of all sizes, with multiple years of EDI experience, are reporting benefits such as reduced transaction processing costs as much as 90 percent and reduced inventories by millions of dollars using EDI/JIT strategies. Others are increasing market share by being responsive with products/services to customers and identifying new market opportunities.

■ **Infrastructure**—When the automobile was introduced, people thought it wouldn't be widely accepted because there weren't

enough people who knew how to operate them (chauffeurs) or roads that were safe to use.

People weren't thinking that designs would continually improve, and that any person could learn to drive and road systems would be built. Today, an EDI infrastructure is in place and constantly improving. There are communications networks (more than 12), and software package alternatives (more than 100), all being supported by EDI service organizations making it safe and cost-effective to do business with EDI.

■ **International activity**—Global competitiveness is one of the most important and talked about factors affecting business today. Consumers worldwide have cast their purchasing votes for price, quality and service—not national origin.

These attributes now are expected for all products or services. This means organizations have to operate smarter, faster, and more accurately while minimizing costs. And, with the emergence of the United Nations sponsored international EDI standard, UN/EDIFACT, barriers to global trade are further reduced as foreign countries are pouring millions into their EDI infrastructures.

■ **Government acceptance**—This year saw the U.S. Government officially adopt EDI as its future direction for conducting business. All areas of government will be moving to EDI-based information exchange in the 1990s. State governments, the court systems and the military are all adopting standards.


■ **Service industry acceptance**—The biggest segment of the 1990 U.S. GNP was attributed to service related industries. In banking, insurance, health care, education, legal, travel, media and many other areas, EDI standards exist or are under development.

■ **Skilled labor force**—The U.S. skilled labor population will be decreasing significantly over the next 20 years, labor costs are rising and requirements are increasing for technical and skilled jobs.

Organizations will have to reduce the need for workers to perform highly repetitive and mundane jobs, ideally performed by computers using EDI. This will allow organizations to retain valuable employees by retraining and refocusing workers to jobs that are challenging, tap creativity and add value to their products or services.

There are many other factors. EDI is much more than a technology for eliminating paper. There are many questions, some answers, and as usual, much speculation regarding the future of EDI. It appears, however, the only question that may be relevant is, when? There are many excellent sources of information regarding EDI. Learn, be prepared, and decide the role of EDI in your organization.

For additional information about EDI or interest in participating in the ANSI standards efforts, contact the Data Interchange Standards Association (DISA) at (703) 548-7005.—Jeff Kessler. Kessler is a founding member of EDI Partners, an EDI consulting company located in Minneapolis, MN.



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CIRCLE 478 ON READER CARD

from a sales drone who gave us the wonderful news: We had six months to install an EDI link to a big customer. If we failed, we would never, ever get another purchase order from them again. We had been pounced upon. The age of EDI had arrived.

Well-skilled in the art of knowing what to kiss, and when, and recognizing the gravity of the situation, we knew exactly what to do. We went to the V.P. and begged for money to throw at the problem.

With dollars in hand, we bought some exorbitantly expensive communications hardware, and some equally expensive software, coded our brains out for a few months and went on-line. Mission accomplished. Or so we thought.

Rather than being an aberrant directive from a single depraved and sadistic customer, it turned out that this was just the first wave. It soon became clear that EDI was one of those strategic direction things, and requests came in from every direction. Every customer we had that belonged to the Automotive Industry Action Group had been reading their newsletters and was going to make us dance the Lambada with their computer systems.

First came the electronic purchase orders. That wasn't so bad, because we liked getting purchase orders, electronic or other-

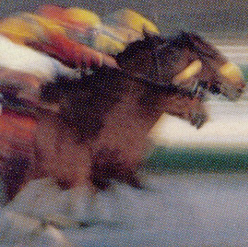
wise. The problem was that no two of our customers wanted to do it the same way. Each had its own format for transaction data sets. Then we had to send advance shipping notifications (ASNs) so that the customer would know the parts were on the way when we shipped them. Of course, we had to barcode the boxes of parts, but that's another war story. Then, the customers started talking about using the ASN's as invoices and electronic funds transfers and E-mail links and sending blueprints electronically. Oh boy.

Pain But No Gain?

AFTER A WHILE, IT BECAME clear that something wasn't right. All those EDI savings didn't appear. While our customers happily enjoyed the advantages of EDI, we spent time and money establishing dial-up links, paying third-party networks, buying software and coding our little hearts out. Our benefit was the pleasure of remaining in business for a while longer.

Even though we were keeping our customers off our backs, we hadn't gone full cycle with the process. Instead of using EDI to our own advantage and linking our order-entry systems to

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Even though 15,000 or so corporations use EDI, that's only about 10 percent of the potential connections.

the EDI subsystem, we just printed out the POs and re-entered them manually. Shipping notices were also just a pain in the nether regions, as were the bar codes and everything else. EDI was nothing but an appendage on our old systems.

Being clever folks, we realized that there had to be a better way, so we designed interfaces to get the orders in electronically. Being lucky, it was also time for us to put in some manufacturing systems, so we took the opportunity to completely revamp our order-entry systems, and EDI became a way of life. Capitalizing on the fact that other divisions in our company had similar requirements, we consolidated all of our EDI onto a mainframe system, and pawned the logistical hassles off on

the data center. EDI was finally settling down to be a normal, effective business practice.

This still left some unfinished business, which for all I know is still unfinished. Even though we let our customers dance with our dates, and gave them their way with EDI, we didn't take their lead and make our suppliers link to us. We were so busy satisfying our customers, that we didn't have the time, energy or funds to make EDI really work for us. That's what you get for being a nice guy.

Apparently, we weren't alone. Even though 15,000 or so corporations are linked with EDI, that still only represents about 10 percent of the potential connections. For different reasons, EDI is still at the stage of being a "promising" technology. To many, it's one of those things that you'll do someday.

The High Hurdles

THERE ARE SEVERAL REASONS why EDI is still only used by a relative handful of companies world-wide, and the pitfalls are considerable.

First off, EDI is expensive and a lot of trouble. If you can't get a majority of your suppliers to hook up, the investment

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won't justify the returns. That's why most of the EDI links in place today are hub-and-spoke arrangements with a big customer at the middle and large numbers of easily-convinced (read intimidated) suppliers hanging on the spokes.

Another problem is the lack of a single, good, solid standard for EDI transactions. Like any other communications problem, EDI is plagued by an excess number of industry and de-

facto standard "solutions" that make connectivity a real chore. There's the US ANSI X12 standard, with all of its industry-specific variants. There's the international EDIFACT standard, which is only partially defined and accepted. There's the European ODETTE standard and a whole slew of proprietary specifications.

Unless you're big enough to browbeat your vendors, plow

[MEANINGFUL DATA: MAKING SENSE OF ELECTRONIC INFORMATION]

When data is received from a customer or vendor in an EDI standard format, the task of restructuring it into a format more readily interfaced with in-house systems is generally handled by a third-party EDI software package. One of the main reasons for using such a package is that the data structure employed in transactions that have been formatted to comply with the popular EDI standards is unlike any other data structure in common usage within business applications.

The data is held in variable length fields called data elements, which are placed in variable length records called segments. Each segment is identified by a record identifier known as a segment identifier, and the record is terminated by a mutually-defined record terminator character or segment terminator. Finally, each data element in the segment is separated from the neighboring data elements by a mutually-defined field separator character called a data element separator. The following example shows a purchase order line item represented in the ANSI X12 standard format :-

PO1*1*50*EA*10.9*CB*123456*VC*ABC001~

segment identifier	data element separator	qualified data element	segment terminator
	qualifier		

This segment represents the first line item of the purchase order, in which 50 products are being purchased at a unit price of \$10.90. The customer's catalog number is 123456, and the vendor's catalog number is ABC001. This example also illustrates the concept of qualified data elements. A qualified data element is one whose contents are only fully known when the preceding data element is examined. For instance, in this example, we know that 123456 is the customer's catalog number because the preceding data element is CB, which represents the buyer's catalog number.

TALKING IN TONGUES

The first generation of EDI software packages were developed to address the need to "translate" this data structure into a file with fixed length fields within fixed length records. The term "translation software" was adopted to describe these packages, and in the early days they merely transformed each of the data elements received in each segment into fixed length fields. This produced a file with all of the received segments transformed into directly equivalent fixed length records with fixed length fields.

If documents represented in an EDI standard format were defined in a completely unambiguous way, translation would be the only

function which was necessary to interface EDI data to business applications. However, within a particular EDI standard format for a transaction or document, such as a purchase order, there are many options for both the placement of particular data within the transaction and the type of data which is included.

For example, in the purchase order line item shown above there are two positions in which the part number can be placed. In fact, the standard allows for a total of 10 different product identifiers on the purchase order line item. The product identifiers used are not tied to any specific positions in the segment, so that the vendor's part number could appear in any of the 10 positions. Both the type of product identifiers included and their positions within this segment are usually at the discretion of the customer. Customers may include any combination of product identifiers and place them in any of the 10 positions available. This is just one example of the options available to your trading partners for the completion of a transaction in an EDI standard format.

THE MAGIC OF MAP MAKING

Variations in the completion of transactions in an EDI standard format need to be addressed in either EDI software or the programs, which interface EDI data to the in-house application systems. As it is not desirable to have to modify application interface programs for every new trading partner that is added, EDI software companies developed "mapping software" to address these problems.

The main object of mapping is to transform any format used by trading partners into a neutral format which is static and which can be used to interface to in-house systems. Mapping software was originally developed to remap the output from translation into a flat file format which could be easily interfaced to existing systems. More recently, the mapping component of EDI software has been integrated with the translation process to allow EDI data to be mapped directly into the desired flat file format.

The design of the flat file to be interfaced between the EDI software package and the application system is critical, and needs to be based much more on the data requirements of the in-house application than the data typically sent or received in EDI transactions. Any variation in format from each trading partner should be handled by the EDI software package. EDI software should insulate the in-house application from these variations and allow the development of application interface programs which operate with static interface file formats.—*Dr. Trevor Richards. Dr. Richards is an EDI Specialist with M.B. Foster Associates Ltd., a supplier of EDI products and services.*

through standards problems or cough up equipment and software for your vendors to use, you won't soon get to implement your own EDI program. Sears, for instance, overcame the problem by giving vendors PC software and training to effect the link. That was nice. The PC approach isn't an optimal solution for the vendors, but it takes care of the problem from Sears' perspective.

The dream, of course, is for universal connectivity and many-to-many EDI links that unify the global economy and make life glorious. Value-added networks offer network links and translation services. X.400 looms on the horizon as the universal message switch. Seemingly hundreds of vendors offer hundreds of solutions for making EDI a reality in our time. Sooner or later it might even work.

Of course, these don't really address the legal aspects of EDI. The lawyers are still busy arguing over whether EDI transactions are as good as the paper they aren't printed on. And we mustn't forget the security aspects: The U.S. government isn't too happy about the idea of encrypted messages or encryption technology leaving the country. For that matter, they don't even want the computers that could be used to run EDI to get into the hands of the Evil ex-Empire or any other potential trouble-makers.

Add to this the natural reluctance of business to enter into uncharted waters, and the prognosis for EDI is still cloudy. It makes sense, and it can save us a mess of money, so it will happen sooner or later. The big question is when.

Bust The Move

IN THE SHORT-TERM, the translation services provided by today's software and the value-added networks will help smooth over the standards bumps. By translating EDI messages into a neutral format (see sidebar), EDI translation software can make EDI data usable by your own systems. All it takes is money. The more you have, the more formats you can deal with.

In the long-term, the undeniable efficiencies afforded by EDI will lead the standards efforts, and EDI will move downstream to smaller companies. With the backing of governments, industry groups and individual large companies, universal EDI can become a reality. In other words, face it, EDI is inevitable. All it will take is time.

There you have it: Time and money cures all that ails the computer industry. Even a cynic has to admit that. For most suppliers, large and small, it makes long-term sense to get with the program now. —Gordon McLachlan is a consultant for National Tech Team in Detroit, MI.

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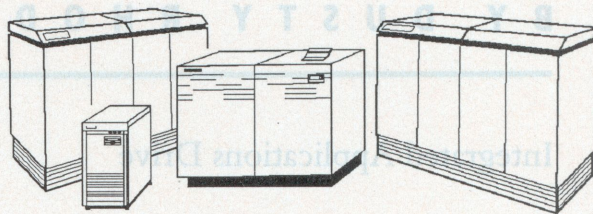
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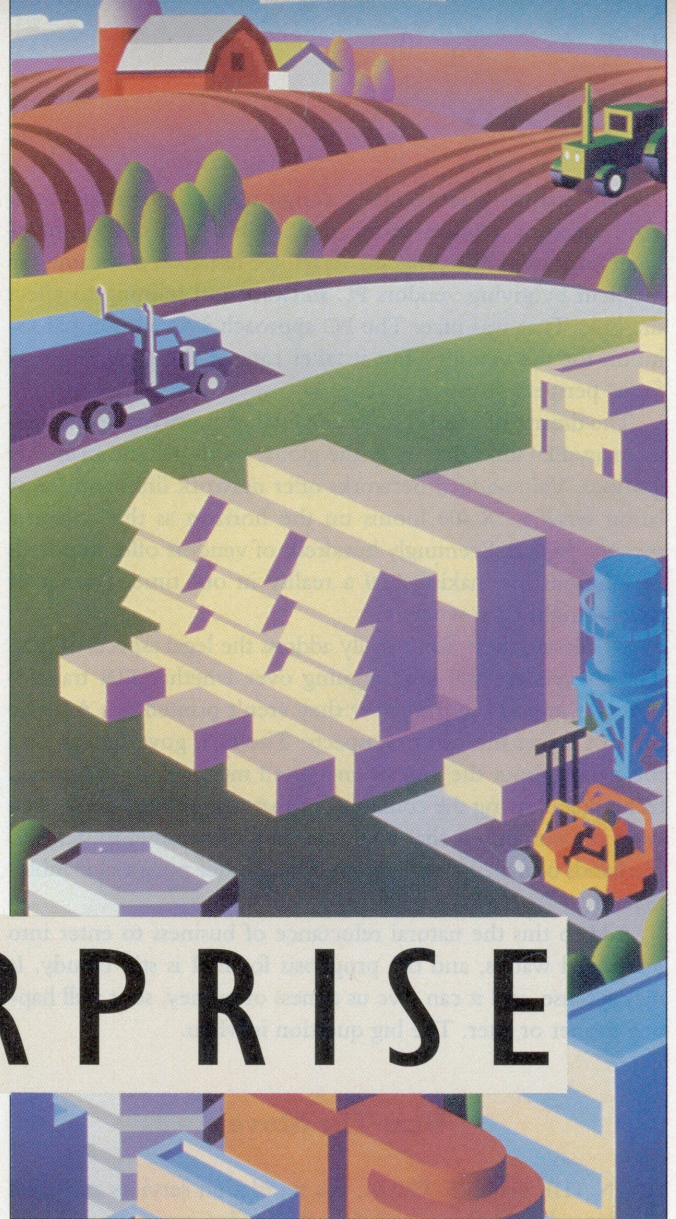
The Keys To The ENTERPRISE

BY DUSTY RHODES

Integrated Applications Drive

Information Systems To New

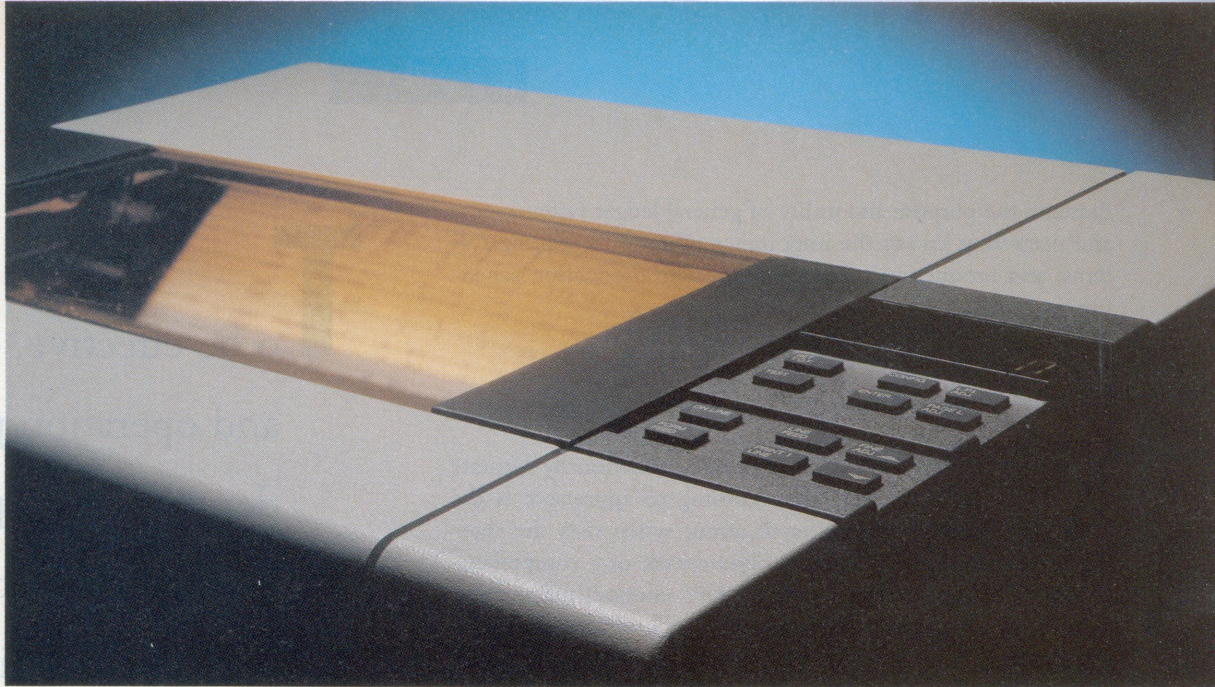
Horizons—Enterprise-Wide Integration



The quest for enterprise-wide integration seems daunting when viewed in its totality, taking in all the multiple levels and layers of integration and permutations of options commercially available today. How to make sense of it can be more than a full-time job, not to mention a growth industry for system integrators.

To many people charged with the performance and profitability of a company, it is viewed akin to magic—they want integrated information systems to “work,” but they don’t want to be burdened unnecessarily with understanding *how* they work. The complexity of these systems is a major cause for the push for standards: in networks and communications protocols, hardware and devices, and in software.

In the mix of technologies that comprise an enterprise system, applications software is a component where perceived value is most easily understood, particularly regarding achievement of business goals: improved customer service, increased productivity, greater profitability. Application systems help individuals carry out their responsibilities: CEOs and accountants un-



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Compiler	\$1,800	\$7,800
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derstand the purpose and utility of general ledger systems; sales and marketing knows the importance of good forecasting systems; and production managers appreciate production scheduling systems.

All Together Now

WHAT MANY PEOPLE in these functionally-separate areas are only now coming to appreciate is the power of these applications when they are integrated. For example, within the framework of a comprehensive sales and operations planning (SOP) solution, information resident in a manufacturing system can be leveraged for use in distribution planning or order management systems. With this level of integration, the true value of enterprise-wide integration—to improve the competitive fitness of the company—is greatly advanced.

Sales and operations planning software is a prime example of an area where integration links between specific functions in various departmental disciplines can address global objectives. The mission of SOP, from a business perspective, is:

- To set overall level of manufacturing output.
- To better satisfy the current planned level of sales.
- To boldly meet general business objectives. This includes inventory balancing, work force scheduling, productivity, profitability and overall competitiveness.

To be effective, SOP must include input and cooperation from marketing, manufacturing, materials, finance and engineering. In short, it demands enterprise-wide integration of the most fundamental kind.

The Technical Challenge

APPPLICATION SOFTWARE VENDORS face a two-fold task in designing and building a set of integrated systems capable of furnishing a sophisticated solution. An integrated solution like SOP has both a technological design aspect and a business application aspect. Our emphasis here is primarily on business applications, but let's touch quickly on how the technology is coordinated. The importance of this aspect cannot be underestimated.

The application supplier wants to ensure application connectivity at the most primary level: the logic applications systems use to handle and solve business problems. This is to ensure uniformity in the way the software interprets the business problem, handles inputs and outputs, and processes the information anywhere on the enterprise-wide, client-server network.

There are numerous areas where application commonality is a critical issue. Field size, data definition and timing are just three key areas. If field size for part numbers, for example, is inconsistent between systems, it is easy to appreciate the con-

To be effective, sales and operation planning demands enterprise-wide integration of the most fundamental kind.

fusion that will result when numbers passing from one system to another are truncated.

Data definition problems arise where different application systems define similar elements differently. For example, consider "balance on hand," a common data element in most manufacturing systems. One system may routinely define it in terms of net units; another, only gross figures. The likely result when you try to fill an order with mismatched systems: some extremely unhappy customers who won't get their shipments when they are expected.

Timing issues are also critical when linking systems. Consider journal entries to the general ledger, for example. If in one application system a certain entry is posted only at month end, but in another, it is posted real time, again, confusion reigns. With simple examples such as these, it becomes apparent that compatible system design is critical in building systems for enterprise-wide service.

Forecasting: The Binding Tie

THE PRIMARY OBJECTIVE of the SOP process is to link sales and marketing strategies to material and resource scheduling in both purchasing and production. In this process, forecasting is the cornerstone upon which accurate and valid plans are laid. Distribution resource planning (DRP) is the tool used by distribution management to plan and control the flow of goods from the source, through the distribution network, to the customer.

In an integrated SOP environment, both forecasting and DRP are used to drive purchasing and the master production schedule (MPS) in manufacturing. MPS linked with order management closes the information loop such that when a customer calls to place an order, the order department can "look" into the manufacturing system to determine what's currently in production to give viable available-to-promise dates. Accurate his-

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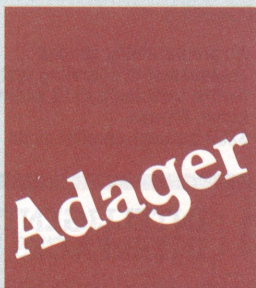
- **The database objects that Adager handles:** capacities, chains, databases, fields, items, paths, securities, sort features
- **The actions that Adager can perform on these objects:** add, audit, change, copy, create, decompile, delete, erase, fix, move, reblock, rename, repack, report, shuffle.

Adager guides you through the pros and cons of specific actions applied to specific objects in a specific database and validates your specifications as you enter them. Adager will not let you violate any IMAGE rules. Should you run into trouble, Adager assists you on the spot. (For example, if you want to add a path to a detail and you have forgotten to add the search field, Adager will invoke FieldAdd recursively within the PathAdd function.)

Adager's command interpreter accepts almost anything. If your computer background requires, you can communicate with Adager in your own cryptic ways, but you don't have to learn a new computer lingo. (For instance, if you want to audit a path to see if it has broken chains, you can say *audit path* or *path audit* or *p au*. Of course, you cannot say *p a* because this could mean *path add*!) All one-word commands that were included in the first Adager release (1978) are acceptable to Adager's latest versions (*ChainFix*, for example).

How do you run Adager, depending on your expertise?

- **In session, NOVICE mode (the default):** This is a nice interactive interface for your first Adager experiences (or whenever you need a refresher). As a bonus, you may request an Adager OnLine tutorial on IMAGE/3000, TurboIMAGE or TurboIMAGE/XL, selected by Adager according to your environment.
- **In session, EXPERT mode (run Adager with "parm 1"):** This is a more direct approach to the task at hand, without the social graces.
- **In session, to build a StreamFile (run Adager with "parm 8"):** This is much more convenient than *blindly* using an editor to create a StreamFile, since Adager makes sure that your answers are correct. For documentation, you may choose to *automatically* include the Adager prompts as comments within the StreamFile itself.
- **In batch (simply submit a StreamFile via the ":stream" command in MPE/V or MPE/XL):** A non-interactive approach, convenient for repetitive tasks or when you are logged on remotely and you don't want to have your task aborted due to a bad telephone line. For convenience, you should build the StreamFile in session mode with "parm=8" (see above).



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torical data on customer orders in order management also gets fed back into the forecasting system, where the process starts all over again.

Decisions regarding profitability and productivity reach into all areas of the business, but with an integrated enterprise solution, all the data can come together in a comprehensive fashion in order that decisions can be made in a timely manner. The integration between systems is the means by which information in one system is leveraged to have value in another system. At the same time, the power of the decision support capabilities within each individual component in an SOP solution is not compromised, either. Each separate application system provides management in that area with powerful tools to do its job.

Within forecasting there are the means to evaluate alternative strategies; to introduce extrinsic factors into the forecasting process; and to measure performance and identify exception conditions. In DRP, there are the means to improve the planning and scheduling of an organization's distribution inventory; to provide a coordinated inventory replenishment plan; to improve inventory performance measurements; and to help determine the most cost-effective means of shipment of goods.

In MPS, functions include the ability to accurately schedule

supply to meet demand within resource limits in an ever-changing environment, while attempting to achieve management's goals for inventory, customer service objectives, and manufacturing efficiencies.

The Next Frontier

ENTERPRISE-WIDE INTEGRATION is a quest worth the investment, one that early implementors are finding promising returns in terms of improved customer service, reduced costs, and strengthened competitive stance in the market. Integrated application software, like an integrated sales and operations planning solution, can play a dynamic role in competitive resourcefulness of a company. When systems are linked together, the power of such a solution provides benefit to the entire enterprise. It is clearly a case of the sum being greater than the parts. In business, that's what the bottom line is all about. —Dusty Rhodes is director of marketing and planning for Dun & Bradstreet in Atlanta, GA.

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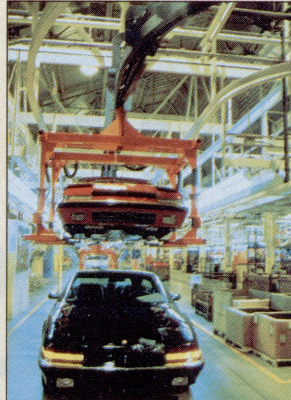
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[CONVERGING TECHNOLOGIES: ENTERPRISE REQUIREMENTS PLANNING]

Faced with the challenges of a global marketplace, manufacturing businesses are setting their operational sights beyond the four walls of each operational unit. They are taking a comprehensive view of their business that includes the entire value chain. The goal is to operate as a single logical entity with physically distributed operations. This combines the benefits of central control and visibility of data with the advantages of being close to customers and suppliers. But operational changes alone won't enable companies to reach the goal. The information systems that support these operations must also be changed to support the business' strategic objectives.

Currently, systems in use provide tactical solutions for specific functional areas and facilities; for example MRP II, DRP, CAD etc. Operational units of the same company often cannot share information easily, let alone with different trading partners. A new model for business information systems is needed to support a comprehensive view of the business operation and truly integrate the tactical elements. Enterprise Resource Planning (ERP) provides this new level of integration.



WHAT IS ERP?

The scope of ERP encompasses the flow of physical goods (and information) from the supplying organizations into the business and subsequently to its customers. Specific applications such as MRP II or DRP are encompassed by ERP. By integrating MRP with other functions in the manufacturing value-added chain, ERP extends the benefits of MRP, such as reduced costs and increased customer satisfaction. What differentiates ERP is a single architecture for multiple functions, locations and business units.

ERP systems provide a consistent framework for communication, data management, and application development that ensures integration of all components. ERP systems unify the enterprise to integrate all aspects of customer contact, manufacturing, delivery and financial reporting.

An ERP architecture provides the framework for integrating the variety of tactical solutions used by manufacturing companies. This includes software currently in use as well as future solutions. An evolutionary approach to integrating new modules into the architecture when needs change maintains the value of hardware and software investments.

ERP: ENABLING TECHNOLOGIES

Underlying ERP are enabling technologies that form a cooperative computing environment. These technology tools are familiar: client-server architecture, distributed relational databases, fourth generation languages (4GL), consistent user interface across applications, and desktop processing. These technologies move the entire system structure from a hierarchical, central processing model, to a distributed cooperative processing model.

Each technology provides a critical component for an ERP system. Client-server architectures support distributed computing and distributed databases; enabling a user at one location instant access to business information at any entity on the network. Distributed relational databases handle information from multiple sites and computers and simplify access to data. 4GL improve extensibility and maintainability. Graphical users interfaces reduce training cost and user productivity. Desktop processing power improves performance and permits integration of PC applications such as spreadsheets, electronic mail and word processing with ERP systems.

The most important and distinctive feature of the client-server processing model is that the technology enables the development of an enterprise-wide model on which to base specific application development. No longer does each user or application need to "know" the model for data and communications of another entity in the enterprise. Instead, integrated database architecture provides the information needed to make information is available across the entire value chain. Data generated by different applications on different platforms can be integrated and presented to the user. Users are then able to easily manipulate, present, and even update information to meet the changing business environment and special needs.

A COMPETITIVE WEAPON

The advent of ERP and client-server computing enables a new kind of organization; one in which business information systems have a magnified role in business success. Information accessibility supports a culture that can be proactive about reducing lead times and cutting costs. It behaves as an integrated enterprise where separate entities share common goals. The company can be more lean than its competitors as well as more responsive to customers because more complete and timely information is available. With the data from distributed operations and activities available at the desktop, companies can reduce the time from order receipt to delivery. Jobs can become less compartmentalized and can encompass more decision-making activities. Enterprise-wide information enables enterprise-wide savings.

The bottom line is profound change for the 1990s. The problems aren't new, but the convergence of technologies to solve them will facilitate more powerful solutions than ever before. And the solutions won't be specific to a single operation or business. They will be solutions that share information through the entire value chain and at all levels throughout the enterprise. This, ultimately, is what Enterprise Resource Planning is all about.—Eric Carlson. Carlson is president of ASK Computer Systems.

MAKING HISTORY

Breaking All Records For Endurance,

The HP 1000 Celebrates Its 25th Year Of Realtime

By Tom Ulrich

Editor's note: This month the HP 1000 celebrates its silver anniversary. That's 25 years of consistent, dependable performance in realtime environments. No other minicomputer in the history of the computing industry can make this claim. In honor of the occasion, HP Professional takes a look at its history and two of its greatest hits in manufacturing.

It now seems so trivial: the ability to read 16 bit words into a 4,096-word memory over a 1.6 microsecond cycle time; it would be nothing for today's realtime systems. But that, in a nutshell, is what the HP 2116A, Hewlett-Packard's first digital computer, the industry's first 16-bit minicomputer and the precursor of the HP 1000, did. It was designed to do this so that it might be used for such noble causes as calibrating instruments for technicians at HP's Microwave division and recording data for scientists at Woods Hole Oceanographic Institute.

Looking back, what seems most remarkable about HP's introduction of the HP 2116A in 1966 was Wall Street's immediate, positive response to its modest success. "We were, after all,

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just developing a controller to automate data acquisition," recalls Willie Austin, a technician who helped design the memory of the computer. Yet many an inventor bet the garage on less proven technology.

The Real Story

J. PRESPEER ECKERT and John William Mauchly created the modern computer in the late 1940s. During its formative years, one machine and a team of programmers could keep track of an entire company. By the mid-1960s, scientists and engineers demanded a more flexible, less expensive

machine that they could operate themselves. Consistent with the dream, Bill Hewlett and David Packard purchased Data Systems Inc. (DSI) of Detroit from Union Carbide during the spring of 1965. Engineers at DSI, a supplier of electronic gear to local automobile manufacturers, had designed the DSI 1000, a prototype for a new class of HP machines.

During the mid-1960s, engineers at HP Labs determined that minicomputers could control the instruments that the company wanted to mass-produce. By June of 1966, they had tinkered with the DSI 1000 design and created the 2116A to control instruments at the corporate lab.

Hewlett-Packard formally introduced the HP 2116A at the Fall Joint Computer Conference in San Francisco during No-

[MAKING IT IN MOTOWN]

(Detroit) — A short distance from the Highland Park plant where Henry Ford built the first moveable assembly line, General Motors engineers still tinker with new ways to install rear axle bushings. Only now, they tweak these fittings by pounding on a computer keyboard instead of clubbing them with a rubber mallet.

GM designed Hamtramck (pronounced Ham-TRAM-ick), the first automobile plant built in the Motor City since 1928, as a showplace for industrial design. The assembly plant contains 260 robots for welding, painting, and assembling automobiles, hundreds of high-tech cameras for measuring the fit of body panels, and 50 automated pallets for moving parts from the storage area to the assembly line. Computer screens illuminate nearly every work station along Hamtramck's 21 mile production line.

Much of the production process is handled by HP 1000s. An HP 1000 computer located in the body shop measures the fit of an automobile frame to four-hundredths of an inch. An A600 placed in the Allante craft center runs the final test on a handcrafted sports coupe. Scores of HP 1000s located in the assembly area control equipment that helps workers install the on-board computers and electrical wiring of each Buick Riviera, Oldsmobile Toronado, Cadillac Eldorado and Seville that moves down the production line.

GM, a leader in computer integrated manufacturing (CIM), has geared up Hamtramck to weld, paint, and assemble these four luxury automobiles on the same production line at mass production speed. "The Hamtramck Assembly Center is involved in a technological leap of considerable significance," says plant manager Lynn Minger.

Thirty IBM and DEC mainframe computers direct production at Hamtramck. These computers store all the information that 4,900 hourly workers and their high-tech automatons need to build GM luxury automobiles.

"HP 1000 series A600 computers located at eight sites along the assembly line help workers install the instrument panel, steering column, engine, and wiring of the automobile," says Dan Meitus, plant supervisor for HP at Hamtramck. "When the automobile frame emerges from the paint shop," Meitus explains, "an assembly worker attaches a sheet of paper with a data processing number on it. The number identifies each automobile part to the line workers and a



mainframe computer. Each part also has a bar code number which also identifies it to a plant mainframe."

Farther down the assembly line, workers install the computer that controls the Riviera's on-board computer screen. Once installed, the plant mainframe sends data that describes one of six optional radios available on that model to an HP 1000. The A600 loads the data onto a computer chip that controls the Riviera's screen displaying the features of the option selected. Similarly, HP 1000s pass the whole range of electronic features to each model made at Hamtramck.

An A600 also controls the electronic treadmill that tests cars as they roll off the production line. HP 1000s keep track of everything from which part an assembly person installs to the accuracy of instrument gauges during a test spin. Fifty-two HP 1000 computers on the factory floor are linked to two A600s in a data center and an A900 in the plant mezzanine. GM uses the A900 to track the quality of each part that workers place in an automobile.

"This computer system allows us to tune the production line," says John Wilson, a senior tooling engineer for GM at Hamtramck. "As we collect data on all automobiles that we produce here, we can demand parts from our suppliers that meet tighter and tighter design specifications."

"One day," Wilson adds, "engineers will make model changes by tapping out a new set of design specifications at a computer terminal. Instead of weeks to retool an assembly plant, it will take minutes."

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vember 1966. At its simplest, the man-sized machine stood six feet tall, weighed 150 pounds, contained nine internal registers, a 4,096-word ferrite core memory, and a large fan. The 2116A directed instruments such as voltmeters, frequency counters, and ohmmeters, gathered data, and compared results.

Six months after its introduction, the 2116A became part of the 2018A Computing Data Acquisition system and the HP 8542 Microwave Network Analyzer system. Dismayed by early sales of the new machine, David Packard and Tom Perkins agreed that Palo Alto division (PAD), manufacturer of the 2116A, should broaden its product line. In the decade that followed, Hewlett-Packard engineers added many features to the 2116A's original design.

- PAD released Real Time Executive (RTE), an HP 2000A BASIC Time-share system, and a 2116B processor during 1968.

- Cupertino division introduced TODS (Test Oriented Disc System), DACE (Data Acquisition and Control Executive), MTS (Magnetic Test System), and DOS for the 2116B by 1970.

- Data Systems Division (DSD) launched RTE-II in 1973, and

dynamic mapping and semiconductor memory for the 21MX processor in 1974.

History In Realtime

HP INTRODUCED THE HP 1000 line of computers and the RTE-III operating system in October 1976. The HP 1000, a direct descendant of the HP 2116A, cost the same as the instrument controller it replaced and performed hundreds of times as many calculations per second as the 2116A could. "We started out as just a controller," explains Tony Cisneros, a technician for the 2116A. "But we found it was a very good computer."

During its first decade, DSD engineers wrote the RTE-IVB, RTE-6/VM, and RTE-A operating systems for use on the HP 1000. They designed and built the A400, A600, A700 and A900 processors. By 1984, DSD marketers determined that their machine could help automate factories. And, engineers refined

[KEEP ON TRUCKIN']

(Fort Wayne, Indiana) — For over 75 years, manufacturing companies worldwide have followed Henry Ford's basic approach to automobile production. Eight years ago, manufacturing engineers at the Allante craft center in Detroit had a better idea. They replaced the moveable assembly line with craft stations — assembly workers with craftspeople; and gave new meaning the GM's advertising slogan: "Teamwork and Technology for Today and Tomorrow."

General Motors, the UAW, and the International Union of Electrical Workers (IUE) have forged a variety of partnerships at the 40 North American plants that GM has built or remodeled since 1981.

Talk teamwork and technology at the Allante craft center in Detroit and you hear the banter of craftsmen at work; talk teamwork and technology at GM's newest high-volume truck plant in Fort Wayne, Indiana and you hear the whir of computers and mechanical arms.

Engineers at General Motors' Fort Wayne Assembly are charting the future of high-volume production with Manufacturing Application Protocol (MAP). MAP, a set of universal communication standards, links an IBM 4381 mainframe computer with four DEC VAX 8600s, 25 Hewlett-Packard 1000 series A900s and 300 Allen Bradley programmable logic controllers. The plant produces GMC Sierra and Chevy C/K trucks.

At Fort Wayne Assembly, each truck order starts down the production line as an empty carrier identified by a bar code. The plant mainframe sends the model, color, and equipment information for a large number of trucks to HP 1000s placed the factory floor. Electronic scanners located along the assembly line read the bar code, passing information back to the minicomputers. These computers select option information for a specific truck associated with each bar

code. They tell 144 robots how to build each truck and flash information on display monitors telling workers which parts to add by hand.

"Twenty-five HP 1000s talk to 300 programmable controllers," says Dave Kuykendall, manufacturing engineer for Hewlett-Packard's Industrial Applications Center (IAC). "Each programmable controller manages a single repetitive action of a robot. A network of larger computers manages groups of robots and coordinates the flow of information throughout the assembly plant. The robot acts as the assembly worker, the minicomputer acts as the line foreman, and the larger computers act as the manufacturing and plant managers."

The dream of engineers at Fort Wayne is for HP 1000s to be the last in a chain of command that reaches all the way back to the dealer's showroom. Someday, should you order a light-duty truck with a blue racing stripe from a GM dealership in Gallup, New Mexico, that message, with a complete list of options, will go to a mainframe computer in Detroit. The mainframe will decide which one of GM's 60 assembly plants worldwide will manufacture your truck.

If you specify a GMT-400 truck, GM's Fort Wayne Assembly could get the request with your list of options. An IBM mainframe in Fort Wayne sends information along to a DEC computer on the factory floor which passes all the optional information to HP computers that control the fabrication, painting, and assembly robots.

In this example, an HP 1000 sends a message to a robot in an unmanned painting booth. The robot sprays a blue racing stripe down the body of your light-duty truck. The IBM 4381 follows your truck to the end of the production line and then reports back to the dealership that your truck is ready to ship.

the HP 1000 to run with computer integrated manufacturing (CIM) software.

Engineers at Data Systems Operation have scheduled the release of the HP 1000 series A990 for early next year. Preliminary tests show the A990 is thousands of times faster than the HP 2116A of a quarter century ago. It is also one tenth the size and one fifth the cost of the original machine.

The evolution of the HP 1000 series A990 from the HP 2116A is astonishing considering its high performance, low cost electronics. Its ability to embody logic, memory, and self-control gives it faculties of the human mind. Like the mind, the A990 and its forebears possess a world of applications — and the promise to change the workplace unequivocally.

Manufacturing The Future

AN HP 1000 CAN EMPOWER a robot with logic to make decisions, memory to follow instructions, and feedback to adjust controls. It can test a jet engine; imprint the best fit for a clothing design on a piece of denim; and regulate a truck assembly line.

The two application stories included with this article all fo-

cus on the automotive industry, but the HP 1000 has literally thousands of successful applications in many industries. Other success stories include Levi-Strauss, Boeing aircraft and a host of other manufacturing concerns.

What new applications will industrial engineers find for the HP 1000 in the decade to come? For 25 years, Hewlett-Packard technical computers have fueled a surge in productivity which historians now call the second industrial revolution. How will factory workers in this age of uncertainty answer the call for revolutionary change. History, as they say, is written by its survivors, and the HP 1000 has enabled many firms to both survive and succeed.

Where will this revolution take us in the century to come? Wall Street and corporate mavens can only guess. Speculation as to the future of the HP 1000 and HP realtime systems is widespread. One strong possibility is that HP will introduce a realtime PA-RISC system in the near future. —Tom Ulrich is a freelance writer specializing in science and technology issues. He writes for several national and local newspapers and is based in central California.

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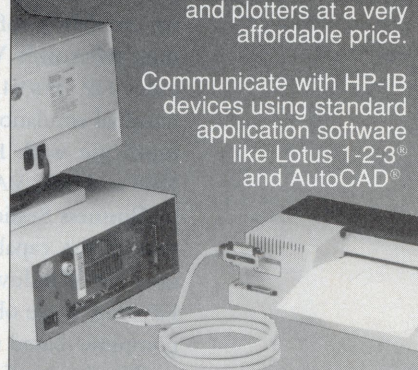
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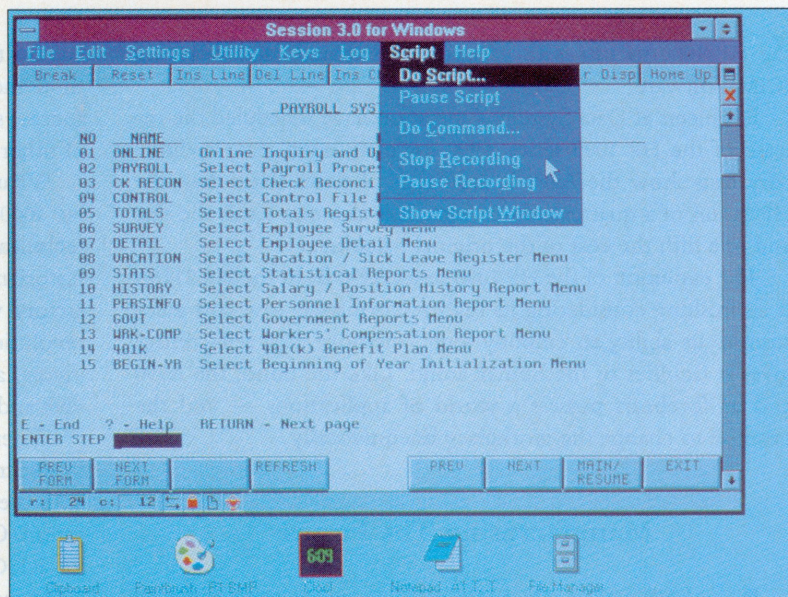
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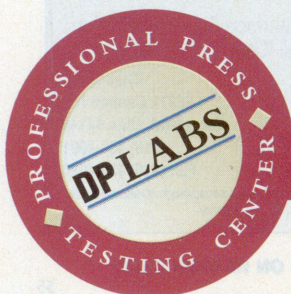
that automates routine or complex terminal tasks.

Get Down To Business

We installed Business Session for Windows and TermTalk on our AST Premium 286 PC and connected the PC serially to our HP 3000. We installed another copy on a Compaq LTE 386s/20 laptop attached to our lab's network via a terminal server. The connection between the PC and the host can be made by way of direct cabling, a modem or a network. Business Session for Windows allows you to access data, applications and the storage capacity of the host.

Installation took less than 15 minutes to complete and is initiated by placing the first disk in Drive A and typing SETUP at the A prompt.

Once Windows is up and running, a Business Session icon appears on the main window. At this point, Business



By George T. Frueh and David B. Miller

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Session for Windows can be started the same way as any other application. You double-click either the file name or the icon with the mouse.

Working Session

Located along the top of the Business Session screen are the Title Bar, the Menu Bar and the Control Bar.

The user-definable session name resides under the Title bar. The Menu bar contains eight pull-down menus where you can navigate through Business Session for Windows.

The File menu contains commands to let you manage files, control printer connection and status, and initiate file transfer. The Edit menu allows you to perform standard editing functions such as copy, cut and paste, copy fields and copy window images.

The Settings menu lets you control all

user-configurable areas of Business Session for Windows. This includes data communication parameters, function key definition, and the auto-execution of command scripts.

The Utility menu allows access to frequently used keys and modes. Break, soft reset and hard reset imitate the same functions as those found on an HP terminal. Line modify mode can be used to correct typing errors in a command line. You also can initiate block or character mode and remote or local mode.

The Keys menu contains function keys F1 through F12. The labels currently defined for each function key are displayed on the function keys themselves and on the menu. The Keys menu also lets you hide the on-screen function keys.

The Log menu lets you control logging. Logging can be directed to a disk

FIGURE 1

```
; A simple minded login script to demonstrate
some of TermTalk's features

; setup some variables

hostn=""
username=""
passw=""

; get login info

while hostn=""
input into hostn prompt "What host to connect
to?"
endwhile

while username=""
input into username prompt "Who are you?"
endwhile

while passw=""
input into passw prompt "Enter your password,
please!"
endwhile

; setup some session configuration parameters

set sessionName to hostn
set emulation to VT100

; connect to VAX/VMS host via the terminal
server's CONNECT command
; get past VAX/VMS username and password
prompts

set waitHostPrompt to off
sendline "connect " + hostn
expect "Username: "
sendline username
expect "Password: "
sendline passw

; prompt for our host

expect upper(hostn) + " $"
set waitHostPrompt to on

; won't need EXPECT statements now
; since host prompt is same until logout

set hostPrompt to upper(hostn) + " $"
;do some VAX/VMS stuff

sendline "dir/date/sec"
sendline "purge"          sendline "show
system"

;logout of VAX

sendline "logout";logout of VAX

; that's all, folks!
```

This simple sample shows just a few of the many things you can do with TermTalk's scripting language.

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file, a printer or the screen. With this menu, you can start and stop logging, log an entire line that the cursor is on, log selected text, and save logged output to a file or to the clipboard.

The Script menu contains commands that are used to create and run scripts written in TermTalk. A Business Session for Windows script is a sequence of statements that performs a function that normally would be performed by a user at

the terminal.

Some of the functions you can perform with scripts include running applications, dialing modems, logging on users, printing files, and exchanging data with other applications using Microsoft's Dynamic Data Exchange (DDE) facility.

Located at the bottom left of the screen are four small indicators that reflect the status of the host connection, logging and script status.

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Super Sessions

Business Session for Windows lets you take full advantage of the multitasking nature of a windowing environment such as Microsoft Windows. For example one window can be used for terminal communications while a second window is used for editing TermTalk scripts. You also can establish several simultaneous serially connected and LAN-based sessions using your PC's COM ports, AdvanceNet, Telnet LANs and X.25 networks.

You initiate multiple sessions by running Business Session for Windows multiple times. You simply set up configuration files for each session, then click on them to run Business Session with the desired settings.

The Tymlink transfer program in Business Session for Windows lets you move data between the PC and an HP 3000 and HP 9000. For data transfer with an HP 1000 and other hosts, Business Session for Windows supports the XMODEM protocol.

BUSINESS SESSION

PLATFORMS: Microsoft Windows, HP NewWave, Apple Macintosh

PRICE: Per copy, single-user versions are \$329 each for Business Session for Windows and Business Session for Macintosh, and \$429 for Business Session for NewWave. Quantity discounts, site and network licenses available.

Tymlabs Corp.

HEADQUARTERS:

811 Barton Springs Road, Ste. 511
Austin, TX 78704
(512) 478-0611
(512) 479-0735 FAX

PRODUCT LINE: Plug-in performance solutions and productivity tools for PCs, Macs and the HP 3000, including backup utilities, language compilers, terminal emulators and file transfer solutions, and electronic forms design software.

FOUNDED: 1980

OWNERSHIP: Private

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[BUSINESS SESSION DOES MORE THAN WINDOWS]

Business Session from Tymlabs represents one of the early leaders in the field of full-featured terminal emulation applications for Microsoft Windows, HP NewWave and Apple Macintosh. If you have minicomputer systems from several different companies, you know how challenging it can be to find a terminal emulator for your PCs that you can use on your all of your systems.

An especially nice feature of Business Session is its ability to emulate different terminals. You can emulate a standard HP 700/94 block mode terminal on your HP 3000 host in one window, and a Digital VT100 terminal in a second window. You can connect to these remote hosts over standard serial lines using COM1 and COM2, or even connect over a LAN. Tymlabs has implemented Business Session so its controls and configuration are manipulated using pull-down menu bars. Of course, HP terminals use a different method, but the functionality is the same.

Beyond Terminal Emulation

Business Session does support several different network connections including HP LAN Manager, HP Telnet, and 3COM LAN Manager. Unfortunately, as the Tymlabs' documentation explains, you have to obtain that from a different vendor. With networking becoming increasingly prevalent, I was disappointed that Business Session requires software from a third-party to work properly.

Like a number of other terminal packages, Business Session features a full set of commands, so you can customize your own scripts. This gives you the ability to customize any data communications operations you frequently use, and to make them menu driven and easier to use. It also allows you to use standard file transfer protocols in addition to Tymlab's proprietary protocols to the HP 3000 and Digital's VAX/VMS. And if you use remote computer services like CompuServe, you'll be glad to discover the XMODEM protocol is available for uploading and downloading files.

Some of the nice features I've known and used for years in HP terminals are included in Business Session. You can log activity from the communications port to a printer or to a disk file. One feature I've long missed in the terminal emulators I've used for years is Memory Lock, the ability to hold part of a display on the top of the screen while the remainder of the screen scrolls. Another feature I have always found useful in HP terminals is Display Functions. This is the feature that lets you see otherwise invisible characters, which can be a real help when you have an unexpected imbedded control character in a file. Happily, all of these features can be found in Business Session.

Bold Innovation

Tymlabs offers a version of Business Session that is fully integrated with NewWave. They deserve high praise for including NewWave integration in their Business Session product. Even though NewWave has received acclaim for innovation, it can still be a challenge to find integrated software. That Tymlabs has taken the initiative to introduce such a solution is commendable. It lets those of us who use NewWave every day access our remote host systems easily.

Moreover, as a Windows application, Business Session provides DDE with other applications, and supports full cut-and-paste capability. The pasting operation even respects the HP 3000's ENQ/ACK handshaking, so you can paste right into an HP 3000 application with no difficulty.

Overall, I think Business Session is a good solution for people who have a need to connect to different systems, and who want all the features you expect to find in an HP block mode terminal. Once you discover how nice it is to have multiple terminal sessions running at once, you may find it hard to go back to your old terminal.—Miles B. Kehoe, PC Editor

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Talking The Talk

TermTalk contains about 85 commands for composing scripts. Examples include clear, connect, open file, receive, send and trap errors. In addition to using the Business Session's built-in editor, scripts also can be created on the fly by starting a live recording session which captures

your keystrokes as you enter them. After recording ends, you can edit the script.

The script in *Figure 1*, where we connected to a VAX using VT100 emulation to perform a few operations, shows off some of TermTalk's capabilities.

The INPUT command allows you to

enter data, with prompting, into variables whose names are significant for up to 31 characters. Other user interaction commands include MESSAGE, which displays a message box, DISPLAY, to display information on the terminal screen and BEEP, which does what it implies.

Logic control is provided with full-function IF and WHILE statements. You can keep scripts modular by calling procedures in the same or in an external file with the DO and DO SCRIPT statements. Even labels and GOTO statements are provided.

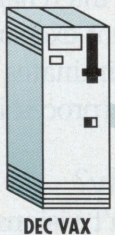
Communication with a host involves several commands. In the sample, SENDLINE sends a string plus a carriage return to the host while EXPECT causes the script to wait until the specified host prompt is returned. After getting by the VMS Username: and Password: prompts, the sample script waits for a host prompt. In this case, the expected string is the host name in all caps followed by a dollar sign. You can specify the host prompt within the script by setting the hostPrompt parameter, thus eliminating the need to use an EXPECT statement each time you enter a command.

The sample script barely scratches the surface of TermTalk's command and function sets. There are commands to manipulate files, not only on your local PC, but also to do file transfers between your PC and a remote host. Business Session configuration parameters can be changed, saved and recalled from within a script. Editing commands allow you to change on-screen data and the clipboard is available for cutting and pasting text.

TermTalk scripts can be run from Business Session's Script menu. They can be attached to a function key and they can be designated to execute upon starting up a new session. TermTalk scripts are not interpreted line for line when they are executed. Script execution is sped up by their being compiled before they are run.

For an enhancement to your current multitasking environment and file transfer capability, consider what the Session family can do for you. ■

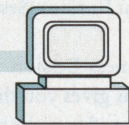
ANNOUNCING NFS FOR THE HP 3000!



DEC VAX

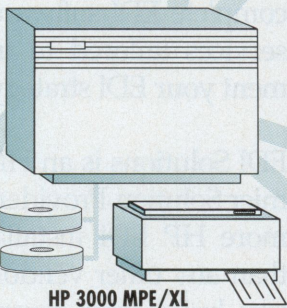
NFS (Network File System), the Unix de facto standard for distributed file access, is now available for HP 3000 systems.

NFS/XL is a high-performance implementation of NFS for MPE XL. NFS is the most popular industry standard networking service that provides transparent access to remote file systems. NFS is supported on a wide variety of machines ranging from workstations and personal computers to mini-computers and mainframes.

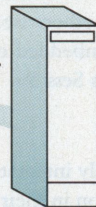
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HP 3000 MPE/XL

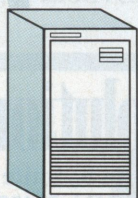
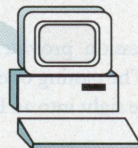
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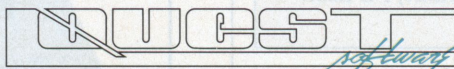
- ◆ API's allow programs to directly access IMAGE databases from any NFS Client.

HP 9000
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PC NFS

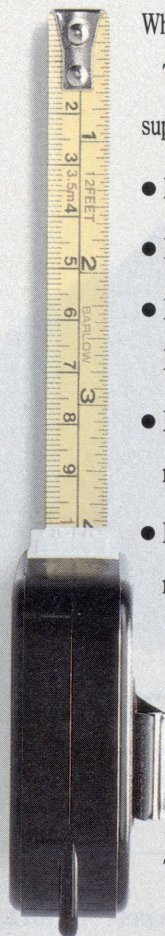


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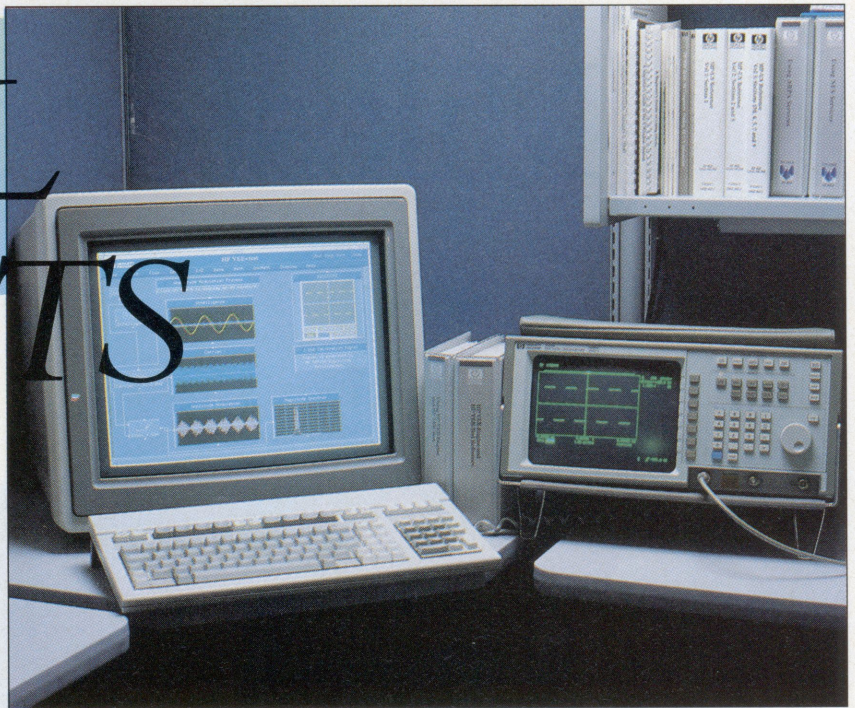
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VISUAL OBJECTS



HP VEE-Test Implements Object-Oriented Technology To Take The Pain Out Of Prototyping

In an R&D engineering or scientific environment, cutting down on the hours of prototyping applications means more experimentation time for the user. HP has done a nice job in creating an object-oriented engineering environment for the engineer and scientist. HP VEE, (visual engineering environment), lets you select and link visual objects together in a block diagram or model, and then execute the model displaying the results.

The visual objects aid in the collection, analysis and presentation of data in either text or graph format.

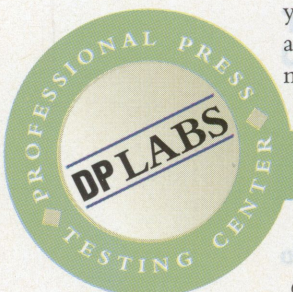
The HP VEE family includes two separate products: HP VEE-Engine and HP VEE-Test. HP VEE-Engine allows you to analyze and display data stored in a file, input by the user or generated mathematically. HP VEE-Test includes all

of the features found in HP VEE-Engine, plus it allows you to communicate visually with instrumentation.

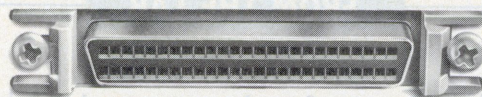
We installed the HP VEE-TEST SE Tape, Revision A.00.00 on our HP 9000/360 workstation. An HP SE assisted us in the installation. We created and installed the software in `/usr/lib/veetest`. HP also provided us with a 54510A Digitizing Oscilloscope, which attached to our workstation via the HP-IB interface. Total installation time took approximately 30 minutes.

At The Controls

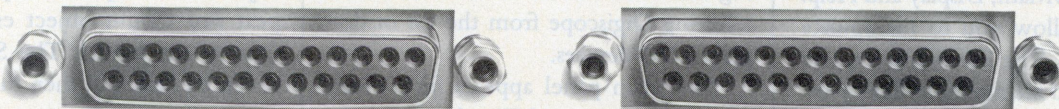
HP VEE-Test is executed by entering "veetest" at the HP-UX prompt. The HP VEE-Test display window appears, which contains a Title bar, a Menu bar and a blank work area.



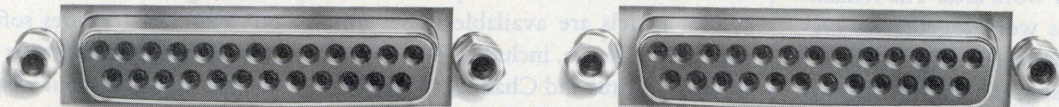
By George T. Frueh



This is your current SCSI port.



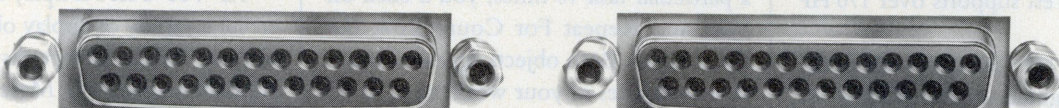
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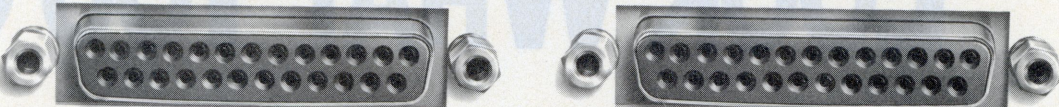
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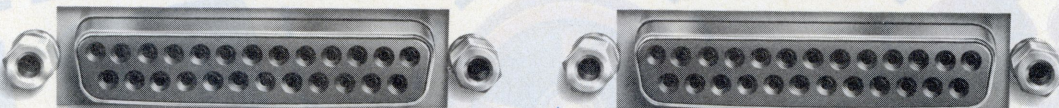
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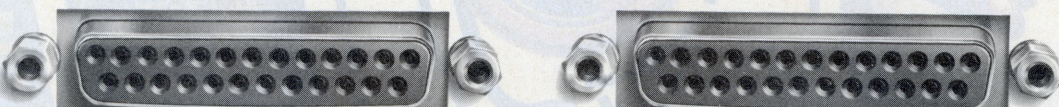
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The Menu bar contains 10 pull-down menus: File, Edit, Flow, Device, I/O, Data, Math, AdvMath, Display and Help. File and Edit allow you to manipulate data and objects. The File menu lets you perform standard file functions like opening, saving and printing files. The Edit menu lets you cut, copy and paste objects within your work area. The remaining eight menus work together to create the personality of HP VEE-Test.

Before accessing the 54510A Digitizing Oscilloscope, we provided information about this device to HP VEE-Test using the I/O menu.

For each instrument, HP VEE-Test needs to know the interface type, (HP-IB, GPIO or serial), the address of the device and the device type. The instrument driver configuration also must be specified. (HP VEE-Test supports over 170 HP instruments.)

We supplied HP VEE-Test with all the necessary configuration information for the 54510A Digitizing Oscilloscope and named the configuration "Digiscope."

Once configured, we generated the soft front panel for Digiscope by clicking Instrument from the I/O menu and selecting Digiscope from the list of displayed I/O devices.

The main panel appears first. From here you can control Timebase settings, Sweep Mode and Triggering source and level. Other discrete component subsystem panels are available to let you control the device, including Waveform, Measure, Status and Channel panels. We were able to control all functions of the 54510A from the soft front panels.

The Flow menu contains objects that affect the way your model runs. The objects in the Flow menu are selected and connected together to form a working flowchart of your model.

For example, if you want to perform a particular task 10 times, you'd click on Start and Repeat For Count from the Flow menu. Both objects appear as movable rectangles in your work area.

A sequence input pin is located at the top of each object, while a sequence out-

put pin is located at the bottom. Connecting the sequence out pin of the Start object to the sequence in pin of the Repeat For Count object establishes the flow of the model. The Start object is executed first, and then the Repeat For Count object.

Making Waves

HP VEE-Test includes software devices that allow you to construct working prototypes right on your display. For example, from the Device menu you can create an object that produces a Delay, a Timer, a Shift Register, an Accumulator and more.

You also can create three virtual sources that include a function generator, a pulse generator, and a noise generator.

HP Vee-Test's Display menu lets you create a variety of display objects to show output. These object displays include AlphaNumeric, VU Meter, XY Trace, Polar Plot, Waveform (Time) and Spectrum (Frequency) displays.

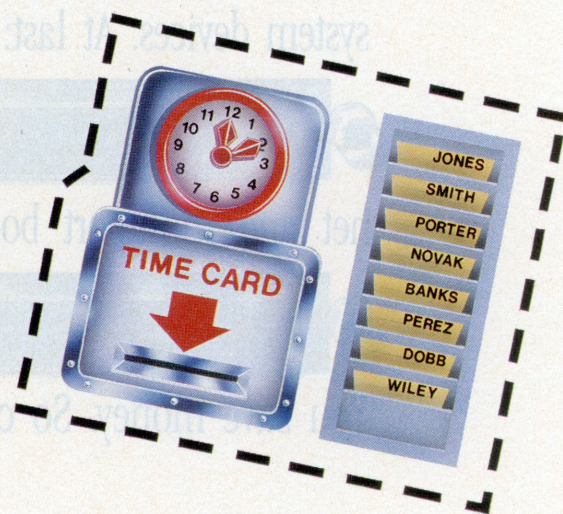
LOOK WHAT YOU CAN



TIME



TAPE



MAN HOURS

We created the Virtual Function Generator object from the Device menu, and the Waveform (Time) object for display from the Display menu. In addition to sequence pins, objects also have data input and output pins.

We connected the data output pin from the function generator to the Waveform data input pin. (This is like connecting the output of a function generator to the input of your oscilloscope). We created a Start object and connected its sequence output pin to the function generator's sequence input pin.

We set up the function generator to output a 1 KHz sine wave. Clicking the Start object caused the function generator to output a sine wave that we viewed on the Waveform object.

HP VEE-Test has a Math and Advanced Math menu. The Math menu has full arithmetic and logic functions. The Advanced Math menu has advanced functions, formulas and mathematical expressions.

We selected Formula from the Math

menu. A formula object appears as a box with a single input labeled A (i.e., Any) on the left, a space in the middle to type your formula, and an output on the right labeled Result.

You can easily add more data inputs to a Formula object. We added a second data input labeled B (Any). Next, we clicked on a second Virtual Function Generator object and configured it to output a sine wave at 93.3 Mhz.

The idea was to create an amplitude modulated (AM) waveform by combining the two frequencies from our Virtual Function Generators, and display the output on a Waveform (Time) object and Magnitude Spectrum object.

We connected both Virtual Function Generator outputs to the A and B inputs of our Formula object, and connected the output of the Formula object to the data inputs of the Waveform (Time) object, and Magnitude Spectrum object. A Start object was connected to the function generators.

Finally, we entered the formula $A*B$

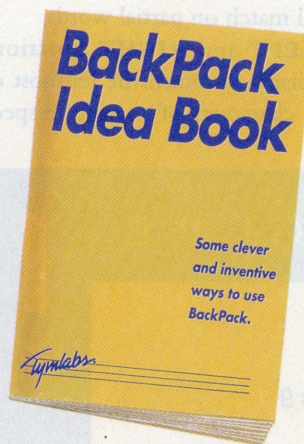
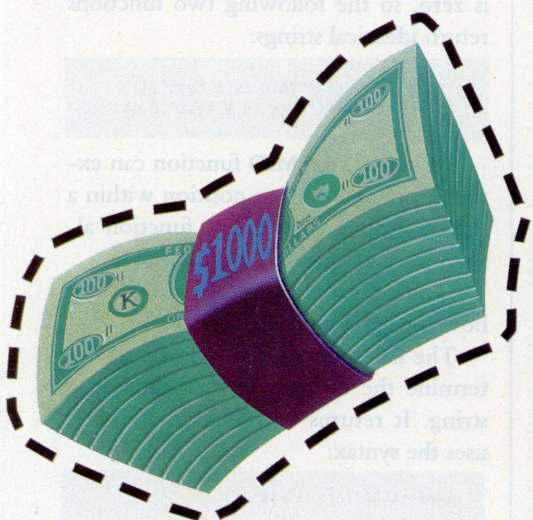
in the Formula object. After clicking Start and performing some minor adjustments to the time span, number of points and amplitude settings, we were able to view the classic AM envelope on the Waveform object. Two spikes appeared on the Spectrum object, indicating the presence of two sidebands.

HP VEE-Test comes with two manuals. The first, "Using HP VEE-Engine and HP VEE-Test", includes information on using HP VEE elements, building models, using instruments, building users objects, and more.

The second, "HP VEE-Engine and HP VEE-Test", reference contains information on all HP VEE objects and menus. It also explains the math and advanced math functions and formulas.

We found HP VEE-Test easy and almost addicting to use at times. The pull-down, cascading menus let you prototype working analog and digital models quickly and efficiently. ■

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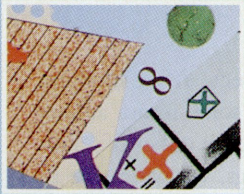
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PC TIPS

Miles B. Kehoe

NewWave ATL Offers Several Functions For Writing Agent Tasks

BASIC Functions

If you've done any programming, you know that a function is

a special type of subprogram that will return a single value. The NewWave ATL includes string and numeric functions, as well as some specialized object handling functions and system time and date functions.

If you're familiar with BASIC, you'll feel right at home with the ATL functions. The function names are nearly identical, and the operation is similar to the functions you'll find in Microsoft BASIC interpreters.

Variable Variables

Remember that variables in the NewWave ATL don't need to be declared before they're used, and that you actually can use the same variable to hold different types of data at different times. For example, you can store a string in a variable in one part of your ATL script, and store a number in the variable later in the same script.

Of course, just because you can do something doesn't mean it's a wise habit or good programming practice. When I'm writing a task, I make sure that I use the same type of data within any given variable. For example, if I use a variable to store numeric data, I won't assign

string data to the same variable name. That way, I'll avoid the possibility of having a run-time error by accidentally trying to use a numeric function on string data.

Also, remember that ATL variables can have long names and must end with a #. For utility and to preserve your sanity, I suggest you limit your variable name to 32 characters or less.

String Functions

The ATL string functions let you manipulate any textual information in string variables or constants. You can use them to extract substrings from constants, to check user input, or to perform any other operation involving string data.

The **FIND** function lets you search a string for a particular substring starting at a specific byte position. The syntax of the **FIND** command is:

```
Pos_Num# = FIND( substring, string,
                 startloc )
```

FIND reports the position within **string** starting at byte position **startloc** where **substring** starts. Consider the examples in Figure 1.

Note that **FIND** is case sensitive, but that it will match on partial words.

The **LEFT** and **RIGHT** functions work similarly to return the leftmost or rightmost characters of a string, respec-

tively. The syntax of **LEFT** and **RIGHT** is:

```
String# = LEFT( string, count )
String# = RIGHT( string, count )
```

LEFT returns a string that contains the leftmost **count** characters of **string**. Similarly, **RIGHT** returns the rightmost **count** characters of **string**. For example, **LEFT("This is a test",4)** returns "This", while **RIGHT("This is a test",4)** returns "test". If the **count** you request is longer than the length of the string, both functions will return **count** characters.

The **MID** function allows you to extract a substring from any location within a string. The syntax of the **MID** function is:

```
String# = MID( string, start, num )
```

Here, **MID** returns **num** characters from **string** starting at byte position **start**. If there aren't **num** characters in **string** the substring **MID** returns will contain all the characters in **string** starting at position **start**.

The first character position in **string** is zero, so the following two functions return identical strings:

```
String1# = LEFT("This is a test",4)
String2# = MID("This is a test",0,4)
```

Of course, the **MID** function can extract from any starting position within a string, although the **LEFT** function always starts at character position zero.

Figure 2 provides some examples of how the **MID** function works.

The **LEN** function allows you to determine the number of characters in a string. It returns an integer value, and uses the syntax:

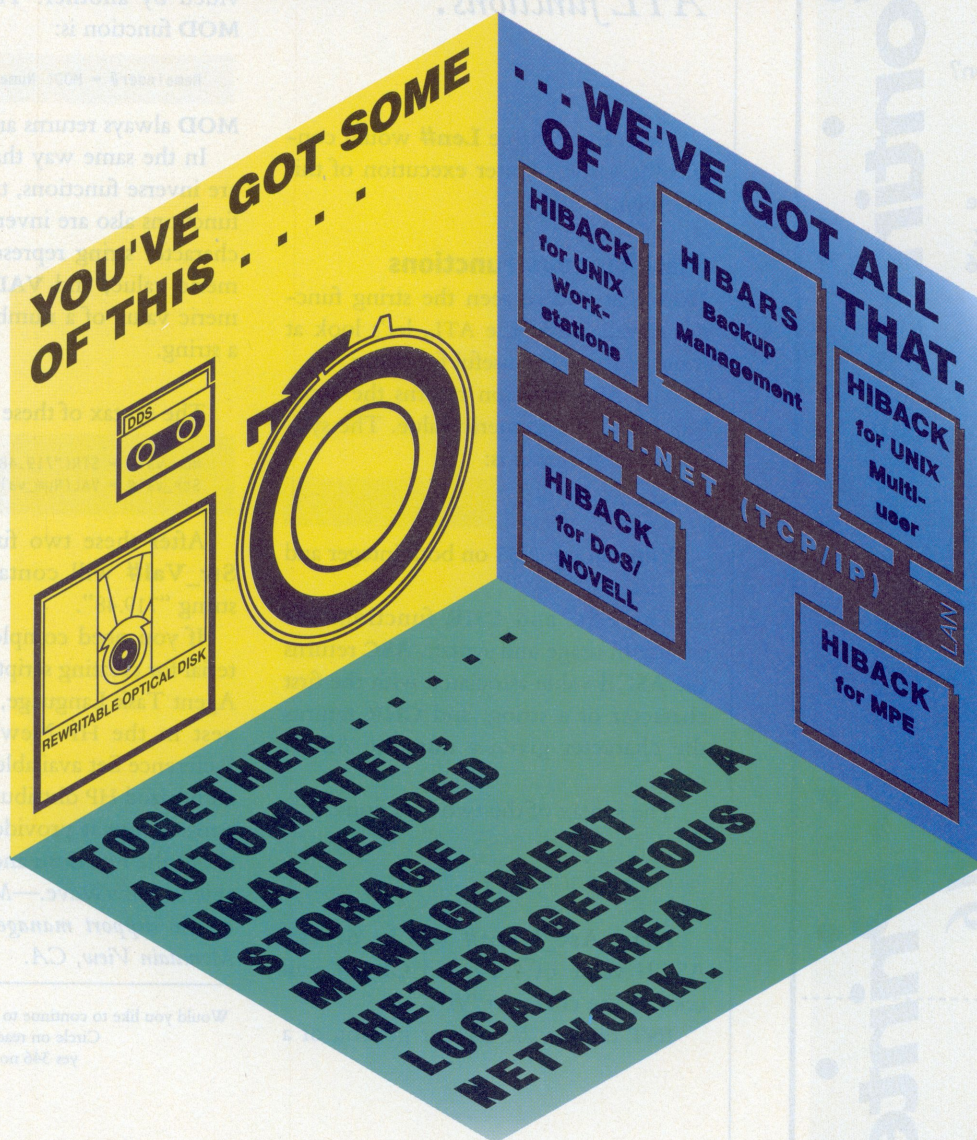
```
Len# = LEN("This is a test")
```

FIGURE 1

```
FIND("MAN", "ONE MAN BAND", 0) returns 4
FIND("MAN", "ONE MAN BAND", 4) returns 0
FIND("MAN", "ONE MAN AMONG MANY", 5) returns 9
FIND("MEN", "ONE MAN BAND", 0) returns -1
```

Examples of how the FIND function can be used.

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If you're familiar with
BASIC, you'll feel
right at home with the
ATL functions.

Here, the variable **Len#** would contain the value 14 after execution of this statement.

Miscellaneous Functions

Now that you've seen the string functions available in the ATL, let's look at some of the other useful functions.

The **ABS** function returns the absolute value of a numeric value. The syntax of the function is:

```
Num# = ABS( -27 )
```

You can use **ABS** on both integer and real data.

The **ASC** and **CHR** functions are similar in usage and syntax. **ASC** returns the ASCII value associated with the first character of a string; and **CHR** returns the character given a numeric ASCII code.

The syntax of the two functions is:

```
Asc_Num# = ASC( "ABC" )  
Char# = CHR( 61 )
```

Here, **Asc_Num#** will be 61, the ASCII value of "A"; and **Char#** will contain the character "A".

INT returns the integer portion of a

numeric value. The syntax is:

```
Int_Num# = INT( Num# )
```

Use **INT** whenever you want to verify that a numeric value is an integer.

The **MOD** function returns the remainder, or modulus, of one number divided by another. The syntax of the **MOD** function is:

```
Remainder# = MOD( Numa#, Num# )
```

MOD always returns an integer value.

In the same way that **ASC** and **CHR** are inverse functions, the **STR** and **VAL** functions also are inverse. **STR** returns a character string representation of a numeric value; and **VAL** returns the numeric value of a number represented in a string.

The syntax of these two functions is:

```
Num_val# = STR( "719.48" )  
Str_val# = VAL( Num_val# )
```

After these two functions execute, **Str_Val#** will contain the character string "719.48".

If you need complete reference material for creating scripts with NewWave Agent Task Language, I suggest you invest in the HP NewWave Technical Reference Set available from HP or your authorized HP distributor. The set is expensive, but it provides complete detail about the functions and statements available in NewWave.—Miles B. Kehoe is an online support manager for Verity Inc., Mountain View, CA.

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FIGURE

2

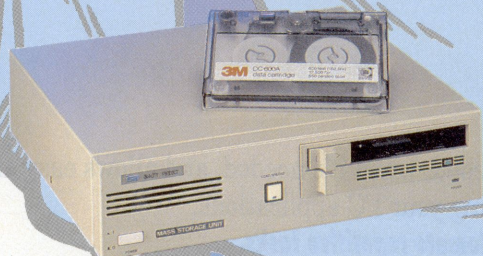
MID("This is a test", 5, 2) returns "is"
MID("This is a test", 5, 20) returns "is a test"
MID("This is a test", 0, 5) returns "This i"

Examples of how the **MID** Function is used.

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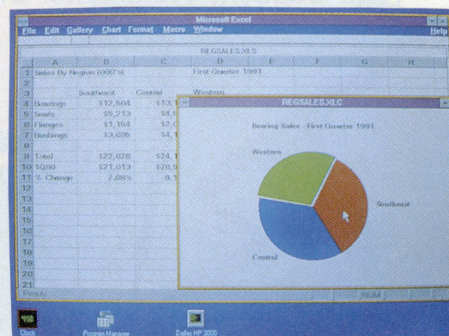
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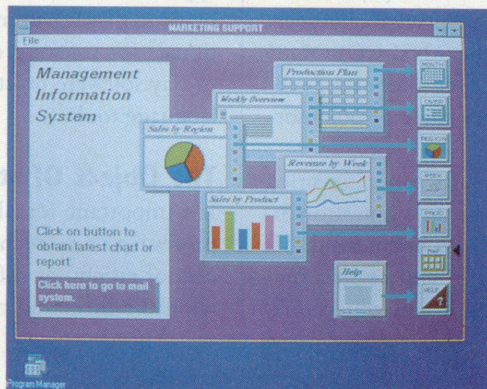
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OBJECTIVELY SPEAKING

Richard Riehle

What We Mean When We Talk About Software Engineering

Object Lessons

Editor's note: HP Professional welcomes Richard Riehle as Software

Engineering Editor. Beginning with this installment, Richard will contribute a regular column, as well as occasional news and features on object-oriented programming and design issues. "Objectively Speaking" will appear bi-monthly.

I've titled this column "Objectively Speaking" in order to encompass not just object-oriented programming techniques, but also information and ideas that will help you make intelligent decisions in the emerging world of software objects. Thinking of software in terms of objects is just one of many new approaches to solving the problem of matching real-world problems to the abstraction we call a computer program.

The traditional approach to this problem, typified by languages such as COBOL, FORTRAN, PASCAL, C and SPL, is often called "imperative" programming. The objective approach includes object-oriented languages such as Smalltalk, C++, Objective C, and Eiffel, as well as object-based languages such as Ada. At a higher level of abstraction is the language independent idea of object-oriented design. It is important to acknowledge that the object-oriented approach is only one of many ways to conceptualize the software development process. Another important and useful method is called "functional" programming, as typified by the language ML and, to some extent, LISP.

Can Software Be Engineered?

When we use the term, "software engineering" we are not referring to the tools being marketed as computer-aided software engineering (CASE) environments.

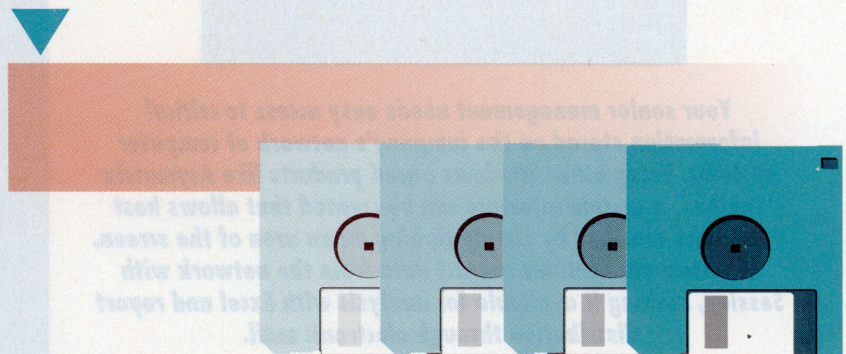
Some of these so-called CASE tools have no relevance to actual software engineering, and their developers have a rather narrow view of the development process. For example, none of the CASE tools for COBOL software development adequately support the software engineering capabilities of the ANSI COBOL-85 standard. Very few have adequate facilities to represent inheritance or polymorphism.

The very phrase software engineering raises questions. The first question is, "Can software really be engineered?" If your answer is "No," you really don't want to be thinking about object-ori-

gineering." Those who see software mainly as an aspect of computer science may be disappointed by constraints placed on "engineered" software. As I emphasize the need for an engineering approach to software construction with objects, I'll also attempt to present a rationale for software engineering in day-to-day software practice with imperative language tools.

The Object Of Study

It's important for all of us as software professionals to recognize that the process of computer software development is on the threshold of a major new way



ented methods. If your answer is "Yes," you've taken the first step on the path to a fascinating new world of software design and development. The goals and principles of software engineering as stated by Goodenough, Ross, and Irvin in their article "Software Engineering: Process, Principles, and Goals," (IEEE, 1975), provide the foundation upon which software will be designed in the future. Object-oriented design, object-oriented programming, and object-based programming are methods that support the goals and principles of software engineering.

Those who see software as an art rather than a science will react with skeptical harumphs when I say "software en-

of thinking. The software industry's discovery that software can be thought in terms of objects is not just another fad, but a fundamental shift in the way we think about the process of software construction. It may well be the equivalent of the transition from individual craftsman to assembly line worker that emerged in the first half of the 20th century. That transition would not have been as revolutionary without the concept of interchangeable parts.

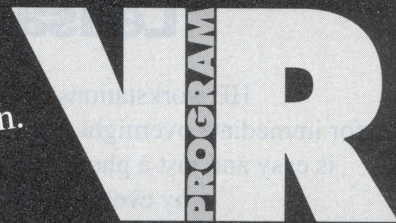
The concept of a software object is not new. It is, however, a concept now gaining acceptance among software professionals accustomed to earlier methods of software design. Put emphasis on the

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phrase, software design. The concept of interchangeable software components will place greater demands on the designer, and that designer will need to have an engineering orientation. We can no longer regard software objects as an interesting fad. Even the venerable lan-

guage of business data processing, COBOL, will have an object-oriented capability in a future incarnation.

There has been a lot of nay-saying in the programming community regarding the subject of object-oriented methods. To many old-timers, the hoopla over a

new method of programming is just that, hoopla. For others, it is a cure-all for managing the complexity of software. Still others see it as one of a number of new ideas to improve the software development process, but not the only one. I tend to fall on the side of those who see it as just one of a set of options.

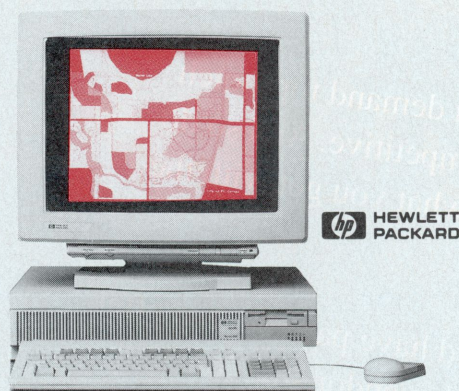
Choose Your Weapon

A software developer may choose a programming method based on the available languages for a platform, the application domain, the need for run-time efficiency and the development/target operating system platform. For example, there are only a few implementations of C++ available for HP-UX (and those depend on which system you have), and there's no production quality C++ that I know of for MPE. There are also other factors such as client demands, programmer availability, and the personal preference of some influential person in management. The size of an application is also important, but frequently overlooked in favor of the arbitrary predilection of the project manager. It might not make sense to create an elaborate object-oriented design in C++ or Ada for a tiny, one-person program with only 500 lines of code.

Another software engineering issue is that of the design/analysis method versus programming method. It is often useful to perform software requirements analysis using a more traditional method (say Structured Analysis), and later organize the results of that analysis using an object-oriented design method followed by either an object-based or object-oriented programming method. In other cases, such as very large application systems involving a team of programmers, object-oriented methods may be more appropriate. A principle issue in selecting an analysis/design/implementation approach becomes traceability. That is, can we trace each component of the programming back to a design component, and each component of the design back to the requirements analysis.

One software engineering goal that we often overlook is maintainability.

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When selecting a design method, a programming language, or a CASE tool, one must consider the total software application life-cycle. This is the one software engineering issue most often overlooked by the programmer. It is one of the most important issues for to be considered by software development managers. Object-oriented methods tend to improve long-term support for maintainability, and this might be one of the more important benefits. Especially, if your software products fit one of these three categories:

- Frequent modification caused by regulatory, competitive, or environmental changes.

- Project team compose of more than two members.

- Multimodule source code of more than 12,000 lines of source code.

Reusable Components

A faddish buzzword currently circulating in the software community is "reuse." The idea of reusable software components, however, is nothing new. It was proposed as long ago as 1969 by Doug McIlroy at the NATO Conference on Software Engineering. A reusable component is a piece of software predesigned for reuse, with a predictable behavior, that can be incorporated into a larger software system without modification. The expression "without modification" is an essential part of the definition.

Hewlett-Packard has an in-house group dedicated to implementing software reuse. Unfortunately, they have made the mistake of trying to implement the reuse policy using a low-level language such as C. From my point-of-view, C is simply a universal assembler and doesn't lend itself to the development of truly reusable software. Instead, HP should be using a language such as C++ or Ada to meet the "without modification" goal of reusable software. Many see the advent of object-oriented methods as an opportunity to make reusable software components a reality. It is an important topic that we can explore in greater depth in a future column.

We may also want to explore the question of whether C++ "friends" vio-

late some important principles of software engineering. We can take a close look at other languages such as Eiffel and Ada. Grady Booch, author of *Object-Oriented Design With Applications*, once said that Eiffel is what C++ would have looked like if it had not been designed from C. Ada is currently regarded as an object-based language because it does not currently support a full inheritance mechanism. It does, however, support the fundamental goals and principles of software engineering, and does support limited inheritance. C++ supports inheritance, but falls short in for development of generic components. The C language is highly flexible but poorly suited to engineering large, reliable software applications.

Rather than a column where I preach and you listen, I'd like this to be forum for exploring practical ideas in software engineering and object-oriented technology. I encourage you to write in with suggestions, disagreements or general grouching. If you have a particular idea to discuss, please share it. I'll give you credit if I decide to use your idea in this column. If you have a question, please ask. I don't have all the answers, but the staff at *HP Professional* are enthusiasts when it comes to understanding things we don't already understand. Also, we do have day-to-day access to other people who are experienced in both software engineering and the construction of object-oriented software.

Would you like to continue to see articles on this topic?
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References

D.T. Ross, J.B. Goodenough, C.A. Irvine, "Software Engineering: Process, Principles, and Goals," Computer (IEEE), May, 1975.

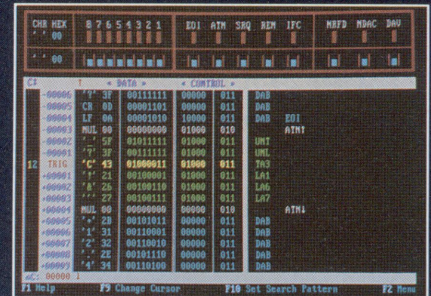
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CIRCLE 108 ON READER CARD



MANAGING YOUR HP 3000

John P. Burke

HP And Its 3000 Crew Deliver On The New Charter For MPE V

A Smooth Sale?

The attendance at this year's INTEREX show in San Diego

may have been lower than hoped for, but most vendors I talked to, including HP, were pleased with the customer response from the show floor. The facilities and weather were excellent and the attitude of the attendees was even better. All in all, it offered quite a contrast from a year ago in Boston.

The rabbit costume and bass drum with "MPE V - STILL RUNNING" emblazoned across it, which were such a hit at the Reno ICMS, showed up again, though I didn't see them in use this time. Perhaps this was because instead of promises, the Application Support Division had some actual results to present. They probably didn't want marketing hype to distract anyone's attention from the deliverables. Yes, there were plenty of "I Love MPE V" buttons passed out, but more importantly, there was real progress delivered.

Five Out Of Seven Ain't Bad

HP announced that five of the top seven MPE V enhancement requests, as determined by INTEREX's HP 3000 System Improvement Committee (SIC), 20 of the top 40 SRs, plus a number of other goodies such as HP EXPLAIN, will appear in Release 23 scheduled for the second quarter of 1992.

This represents a tremendous achievement for an HP organization that was only recently formed. After all, the plan to create the Software Technology Center (STC) was first presented by Marc Hoff, general manager of the Application Support Division, at the Reno ICMS in March, and we were asked to be patient until August, at which time plans for MPE V, etc., would be forthcoming. The

results far exceeded my expectations, and Tony Engberg, R&D Manager for the STC, and everyone associated with his organization should be proud.

Before we get carried away with MPE V euphoria, however, a little dose of reality is needed. These enhancements to MPE V are fairly minor in scope and difficulty. In part this is because HP is properly committed to maintaining a smooth migration path from MPE V to MPE XL. It's also because MPE V will never have



the functionality of MPE XL. The really important news here is that HP, unlike other major vendors, is listening to its installed base and acting upon customer requests. MPE V, for this reason, will continue to be a viable operating system platform for many years to come. When you do move to MPE XL, you can be assured that it's for sound business reasons and not because you were forced into it.

A cynic (my role) might suggest that all of this MPE V activity is simply an effort on the part of HP to protect a significant revenue source: support dollars. Prior to the forming of the STC, customers were publicly threatening to dump their support contracts if MPE V, TRANSACT, etc., were left for dead.

According to Marc Hoff there are 14,000 "customers" using MPE V support. He didn't define "customer," but if we conservatively say one "customer" equals one machine and conservatively estimate that each customer is paying \$7,500 per

year in software support fees, then software support for Classic systems is a business worth \$100 million plus each year! When you figure the maximum direct and indirect costs of the business, you find that it is actually a \$100 plus million cash cow. Certainly, for the foreseeable future, we deserve to see continued support and enhancements to MPE V.

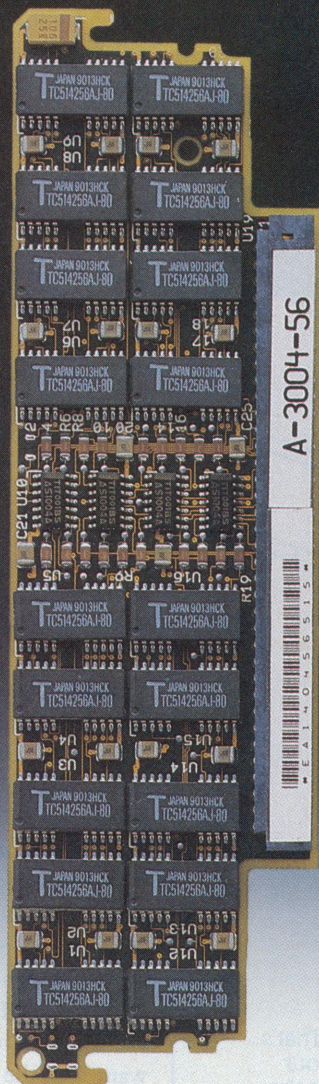
One of the more interesting rumors making the rounds was that the creation of STC was part of an effort to resuscitate MPE V and discourage, or at least delay, migration to MPE XL systems. The theory goes that the HP 3000 Series 900 systems are aimed at new customers because HP's support organizations—hardware support in particular—would be significantly overstaffed and underfunded if there were a mad rush to migrate. The 9x7 systems are expected to be incredibly reliable and support is priced accordingly. A slower migration to the new systems will allow HP to gracefully retool itself to deal with shifting revenue sources (more from software and services and less from hardware). As partial proof of this theory, proponents cite the near total absence of the HP's traditional year-end migration incentive.

Hold 'Em Or Fold 'Em?

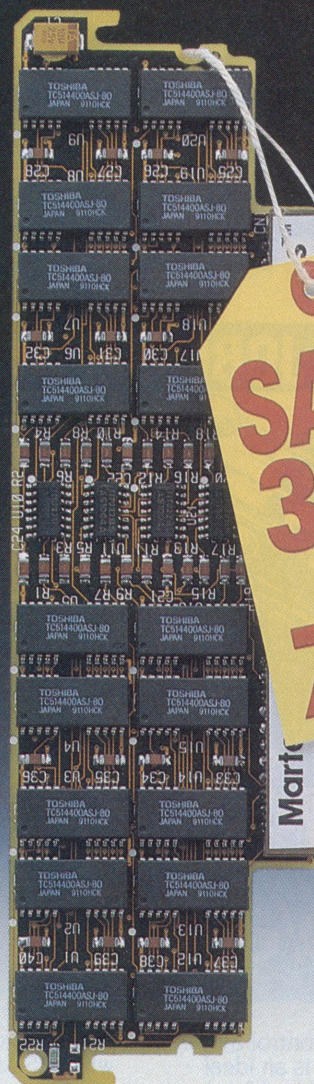
Although it seems that almost all the HP 3000 articles in the technical and trade journals are about PA-RISC, MPE XL and ALLBASE/SQL, there is still a sizable MPE V installed base and considerable interest in what is happening with MPE V, the so-called "mature" software products and the Classic HP 3000. I intend to address Classic HP 3000 and MPE V issues as long as there is a perceived interest, even though I am anxiously awaiting the installation of a 922 here at DP Labs.

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CIRCLE 220 ON READER CARD

hands on an XL machine. But if you are also a manager as I am, you must consider business needs and strategy and make business decisions. The "no-brainer" decisions to migrate to MPE XL already have been made. For the rest of us, the desire to be at the technical leading edge does not always coincide with

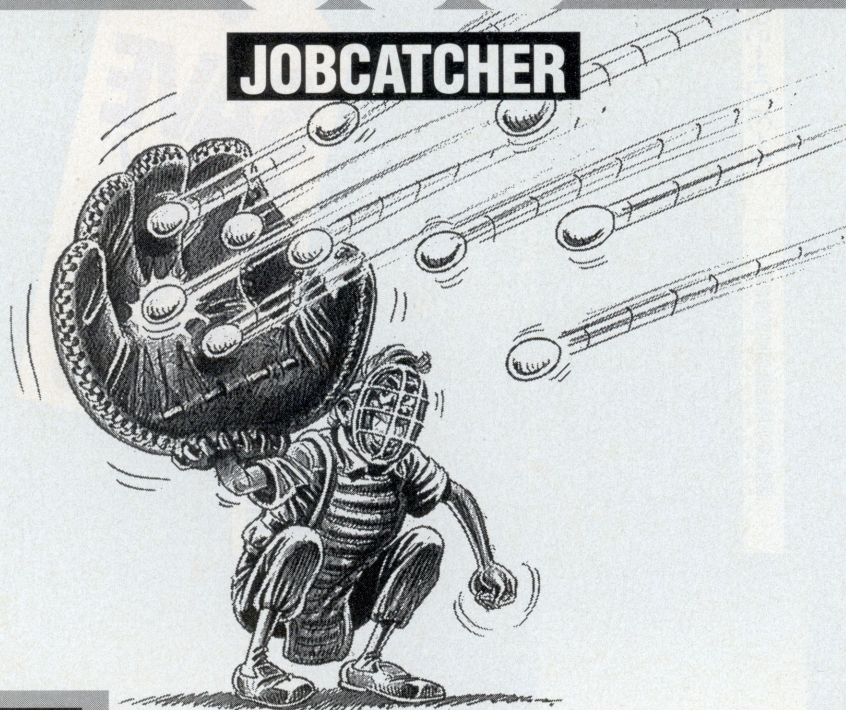
business realities. While I am dying to bring in an XL machine to replace my venerable Series 58, I must seriously weigh the other options: stand pat for the next 12 months; acquire a more powerful Classic system(s); or, migrate to another platform.

Despite HP's renewed commitment to

support MPE V, the reality is that the Classic is a doomed machine. The bells tolled with the publication of the July 1, 1991 Hewlett-Packard HP 3000 Computer Systems Price Guide. The last remaining Classic, the Micro3000, was gone. Replacing it are the slick 9x7 Novas. An era has ended. Ultimately, you will either migrate to an MPE XL machine or to another platform altogether.

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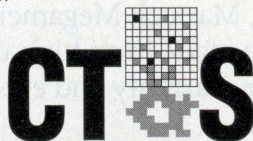
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No, I haven't been munching on mushrooms. Those enhancements are all either scheduled to happen or are under serious investigation by the TurboIMAGE development staff. Doesn't sound like TurboIMAGE is ready for the scrap heap to me.

Does this mean you should ignore new technologies? Absolutely not! But, there is certainly no need to throw out everything you've done and rush to embrace every new technology kid on the block just to be politically correct.

An amusing question at the HP Management Roundtable concerned the unbundling of ALLBASE/SQL. The question went something like this: If ALLBASE/SQL is now worth something, can I sell it back to HP since I didn't want it in the first place and have never used it? Rich Sevcik, general manager for the Commercial Systems Division, who by this point has grown quite adept at handling these knotty database questions, politely answered, "No."

The New Math

One of my favorite questions/answers—and a wonderful example of the MBA's New Math—had to do with the recent unbundling of ALLBASE/SQL. You'll recall that when TurboIMAGE was un-

bundled from MPE in early 1990 there was a firestorm of protest. Most of the protest centered on the perceived de-emphasis of TurboIMAGE in favor of ALLBASE/SQL, although a few people questioned the prices assigned to TurboIMAGE. IMAGE prices were only provided in the form of delete options, but because there was nothing to compare them to—the ALLBASE price still being bundled into the cost of the overall system—the price protest fizzled. The other shoe finally dropped when HP recently unbundled ALLBASE/SQL and people had an opportunity to compare the prices assigned to the two DBMSs.

On a 917LX, TurboIMAGE is a \$2,500 delete item and ALLBASE is a \$1,500 delete item (off a base system price of 18,500). On a 957, TurboIMAGE is a \$45,000 delete item and ALLBASE is a \$15,000 delete item (off a base system price of \$160,000). Finally, on a 980/200, TurboIMAGE is a \$75,000 delete item and ALLBASE is a \$20,000 delete item (off a base price of \$1,050,000). Note that all prices quoted are from the July 1, 1991 HP 3000 Computer Systems Price Guide. Note also that being constantly bombarded with TPC performance benchmarks showing how ALLBASE/SQL is just about the greatest thing since the invention of the computer.

One reasonable way of looking at these prices would be to conclude that on a 957 TurboIMAGE is valued at three times the price of ALLBASE/SQL. Ah, but not with the new math. With the new math, an HP executive will look you in the eye and maintain without so much as a smirk or a wink that a Turbo-only 957 costs only 26 percent more than an ALLBASE-only 957, and therefore, there is not a significant price differential between TurboIMAGE and ALLBASE/SQL. And anyway, TurboIMAGE has slightly higher performance capabilities so it should cost slightly more, right? Work it out for yourself.

Voodoo Economics

It ought to be illegal to use percentages with dollars. There are certainly many things I could do with that \$30,000 dif-

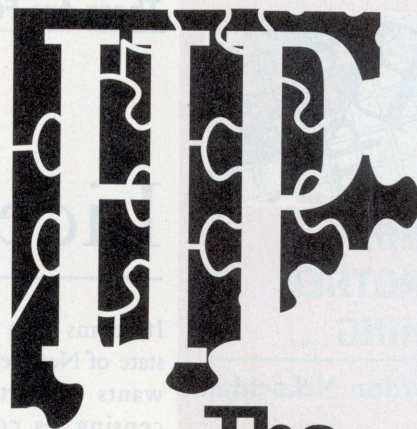
ference on a 957. Like for instance buy some of the third-party tools necessary to manage and develop Turbo-based systems—tools whose functionality is already included in ALLBASE/SQL for what can only be considered a bargain basement price. ALLBASE is, with apparently little justification, priced well below competing RDBMSs.

HP could charge almost anything it wanted for TurboIMAGE, and it would not significantly affect the number of systems sold. If a customer is using TurboIMAGE extensively now, it is unlikely they will switch or be able to switch in any reasonable time-frame. If a current or new customer is not using TurboIMAGE, it is unlikely they will take the politically incorrect step of plunging into TurboIMAGE development.

Given this, it is to HP's credit that the prices being charged for TurboIMAGE are not unreasonable for the performance, security, reliability and functionality offered. If as part of the company's overall strategy it wants to promote the use of ALLBASE/SQL by either giving it away or charging an artificially low price that is its right. Just don't play head games with us about intentions. Perhaps what we're dealing with here is a new version of voodoo economics?

Of course there's an old marketing adage that says if you charge a premium price for a product or service, it will be perceived as a premium product or service, and conversely. Perhaps we should conclude then, that ALLBASE/SQL is in fact inferior to other RDBMSs available for the HP 3000. HP executives in an effort to be seen as, dare I write it, "open," have a tendency to try to prove that an action makes general logical sense when in reality the only sense it makes is that it is to HP's perceived advantage. This has the undesired effect of insulting the questioner and painting HP into a corner. The original unbundling of TurboIMAGE and the brouhaha that resulted is a "Classic" example of this problem.

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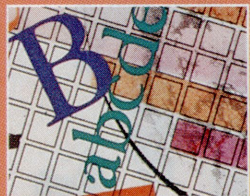


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CIRCLE 101 ON READER CARD



AND ANOTHER THING ...

Gordon McLachlan

Licensed To Code

It seems that the state of New Jersey wants to start licensing its com-

puter jockeys, and the industry there is getting a little upset over the prospect. I don't know what the problem is, I think it's a great idea.

Think about it. If somebody wants to cut your hair, they have to undergo thorough training and give cheap haircuts at the beauty school for months. Then they have to take a test, just so you won't look funny. Granted they're required to wield sharp instruments and apply dangerous chemicals to your scalp, but should requirements for computer jockeys be any less stringent? Of course not!

The truth is that computers are dangerous implements. One errant bit can blow up a rocket or trigger the thrust reversers on a passenger jet. Do you want any boob to be able to walk in off the street and claim to be a trained computer professional? Those boobs should have to undergo hours of intense training and a grueling three-hour test with a No. 2 pencil before they're allowed to claim professional status.

Subject To Scrutiny

As a matter of fact, we really ought to set up licensing for all the subspecialties, too. It's not enough just to ask a few simple questions about computer and programming theory to establish credentials. If we want that license to mean something, we have to ask some really hard, specialized questions.

For instance, any PC support professional should know which side of a PC to whack when a hard drive flakes out, or how to strip the copy protection off of common software packages. Network

jocks should certainly know how far you really can stretch an RS-232 wire before bits start mutating in it, and who could deny the value of memorizing the names of the seven layers of the OSI model?

I would even advocate licensing computer sales personnel. The questions would be simpler, but would have to cover such topics as calculating blood-alcohol limits and the ethics of throwing golf games with customers.

**Do you want any boob
to be able to walk in off
the street and claim to
be a trained computer
professional?**

As well as serving to weed out the charlatans, licensing would also be a valuable tool for policing our ranks. Programmers who write bad code or documentation could be disciplined in several ways. If we had licenses, we'd have to have licensing boards, which could yell at bad computer people, fine them, or even suspend or revoke their licenses: "Screw up one more time, buddy, and you'll never program in this state again!"

Political Implications

Of course, that points up another problem: Licensing won't work if the only place they do it is in New Jersey. If I was a computer jock in Joisey, it wouldn't take much to send me over the border. Licensing won't do much good if all the bad ones just go to New York or Philadelphia. If we want maximum protec-

tion, we've got to implement licensing on a nation-wide scale, with reciprocity between jurisdictions, so we can hunt down bad jocks like dogs.

Licensing also has an economic benefit for all of us. Even though it will probably cost a few hundred bucks to get some cram training and take the test, think of the all long-term benefits.

Entrepreneurs who offer cram courses or sell the answers to the tests will develop a whole new high-tech industry. This is exactly what every city and state wants, because it doesn't smell as bad as low-tech.

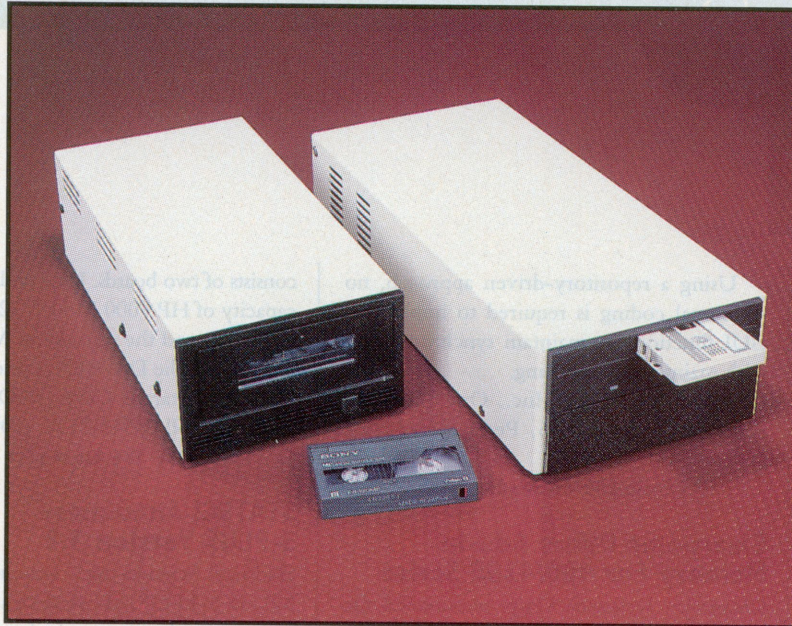
The fees from the license exams will provide a steady flow of cash into the state's coffers. In New Jersey's case, this is vitally important. After all, you can only squeeze so much vigorish from old ladies on day trips to Atlantic City, and there's only so many landfills.

If it's properly handled, licensing also can be used to restrict the entry of new people into the field. If we can make the requirements tough enough, all of us who already have our licenses will be able to command exorbitant salaries and fees. Hell, if we could just stop the contract body shops from importing boatloads of third-world FORTRAN programmers, we'd all already be driving BMWs.

On top of the lifestyle boost, think how proud your mom will be when she finds out you're a licensed professional, just like your cousin the lawyer and your brother-in-law, the professional engineer with that nice place on the shore.

I think I'll move to New Jersey. I want to be someplace where they appreciate a real professional. —Gordon McLachlan is a consultant for National Tech Team in Detroit, MI.

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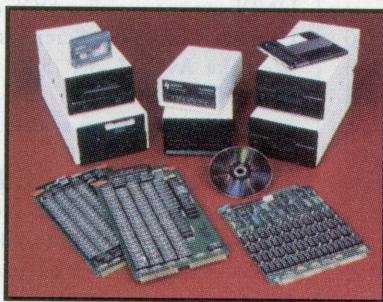
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DBfree Interfaces To Superdex

Los Altos Software announced that DBfree now features a seamless interface to Superdex.

DBfree is Los Altos Software's natural language database information update and retrieval system for the HP 3000. DBfree supports ad-hoc inquiry, reporting and update database access under full control of the system manager.

With the new interface, wildcard searches will take advantage of a Superdex index. In the absence of Superdex, the user can proceed on a serial basis. Built-in supervisory controls preview and limit the number of entries accessible to each user.

DBfree is available at a single-site license fee of \$2,500 for either classic or native-mode versions, with the DBfree-to-Superdex interface provided at no extra cost. Contact Los Altos Software, P.O. Box 639, Los Altos, CA 94023; (415) 941-6030.

Circle 380 on reader card

CGI Introduces Automatic Windowing Facility

CGI Systems introduced a windowing facility for automatically generating GUI mainframe applications directly from a workstation-based repository.

CGI's repository-driven windowing facility generates mainframe COBOL programs with a windowed GUI layer from a single set of specifications stored in CGI's repository. The GUI mainframe applications can be generated from COBOL applications developed with or without PACBASE.

The CGI repository resides either on a mainframe or on an OS/2-based LAN. The repository acts as a central bank of system design specifications and is able to exchange data with IBM's mainframe-based Repository manager/MVS through IBM's Common Programming Interface (CPI). Both OS/2 Presentation Manager and Microsoft Windows GUIs are supported by the new automatic windowing facility.

Using a repository-driven approach, no additional coding is required to implement GUI functions or maintain synchronization with mainframe processing.

Contact CGI Systems Inc., One Blue Hill Plaza, P.O. Box 1645, Pearl River, NY 10965; (914) 735-5030.

Circle 389 on reader card

Clearpoint Offers Add-In Memory For 400/425E Series

Clearpoint Research Corp. announced the HPME-42E add-in memory upgrades for the HP Apollo Series 400 Model 425E. The HPME-42E is available in 4 MB, 8 MB and 16 MB upgrades allowing a system memory capacity of 48 MB.

The HPME-42E attaches directly to the cpu and is fully operational with the Model 425E. Manufactured with 1 or 4 MB, 80 ns SOJ DRAM, the HPME-42E supports both HP-UX and Domain OS/UX, all operating system error checking, diagnostic and boot routines. The 425E has six SIMM sockets available for memory expansion. HPME-42E 2, 4 and 8 MB SIMM modules must be installed in sets of two in order to support system interleaving.

Pricing for the HPME-42E/4MB is \$710 and includes two 2 MB SIMMs for a 4 MB upgrade. The HPME-42E/8 MB is priced at \$1,350, including two 4 MB SIMMs for an 8 MB upgrade. The HPME-42E/16 MB costs \$2,650 and includes two 8 MB SIMMs for a 16 MB upgrade.

Contact Clearpoint Research Corp., 35 Parkwood Dr., Hopkinton, MA 01748; (508) 435-2000.

Circle 388 on reader card

Dataram Offers Add-On Memory For HP 9000/700s

Dataram Corp. introduced the DR-9700, a new expansion upgrade designed to increase the memory capacity of HP 9000 Models 720, 730 and 750 workstations.

The DR-9700 is a 16 MB board-set that

consists of two boards. It expands the memory capacity of HP 9000 Models 720 and 730 up to 64 MB and the capacity of Model 750 up to 96 MB. The DR-9700 is priced at \$3,920. Contact Dataram Corp., P.O. Box 7528, Princeton, NJ 08543-7528; (609) 799-0071.

Circle 384 on reader card

STATSCI Announces S-PLUS Version 3.0

Statistical Sciences Inc., announced Version 3.0 of S-PLUS, its statistical computing language and system, which now adds true object-oriented modeling capability.

S-PLUS features built-in modules for statistics and graphics, scientific analysis and mathematical computing. The S-PLUS programming environment offers users the ability to tailor statistical and graphical analyses to any problem, enabling them to write functions and/or interface to C and FORTRAN routines to create custom solutions to scientific data analyses and statistical problems. S-PLUS also prints publication-quality graphics through HP LaserJet and Postscript-based printers.

S-PLUS is available on most popular UNIX systems as well as DOS computers. Contact Statistical Sciences Inc., 1700 Westlake Ave. N. Ste. 500, Seattle, WA 98109; (206) 283-8802.

Circle 400 on reader card

Extended Systems' EtherFlex Supports Ethernat, Netware

Extended Systems introduced Etherflex, a flexible network-printer interface for the HP LaserJet Series II, IID, III and IIID printers. EtherFlex allows direct printer connection anywhere on an Ethernet LAN and provides Apple EtherTalk and Novell NetWare LAN support. The upgradable protocol module allows EtherFlex to support multiple LAN protocols in a single product.

EtherFlex installs in the optional I/O slot of the HP LaserJet. Users set the EtherFlex protocol switch at installation for either

EtherTalk or Novell NetWare 386.

In EtherTalk mode, EtherFlex offers "plug-and-play" connection of the LaserJet printer to an Apple EtherTalk LAN. EtherTalk mode requires the LaserJet to have the HP Postscript cartridge installed.

Under Novell NetWare mode, EtherFlex can operate as a dedicated print server to provide enhanced printing performance. EtherFlex also supports the Novell NetWare Print Server VAP/NLM/EXE. The EtherFlex model ESI-2856A is priced at \$695.

Contact Extended Systems, 6123 N. Meeker Ave., Boise, ID 83704; (208) 322-7575.

Circle 399 on reader card

PRESYS 1000 Offers Simultaneous Interfacing

Preston Scientific announced the PRESYS 1000 Data Acquisition and Processing System, allowing simultaneous interfacing with as many as four computers including HP 1000, DEC/VAX and MicroVAX systems.

The PRESYS 1000 BUS concept permits any digital or analog card to be installed in any of the open card slots in the PRESYS 1000 System. Because the PRESYS 1000 System's main chassis is of the "standard" configuration for all applications, any change in the system's performance can be made on-site. In addition, the PRESYS 1000 System can be retroconfigured to a previous test arrangement should an old test or simulation format need to be repeated.

The PRESYS 1000 System provides a full compliment of both analog and digital signal handling and conditioning functions in one instrumentation package that can include any combination of multichannel, very high speed, high resolution A/D conversion, D/A conversion, low-level and high-level analog signal amplification and multiplexing, extended digital input and output signal memory and control functions.

Contact Preston Scientific, 805 East Cerritos Ave., Anaheim, CA 92805; (714) 776-6400.

Circle 398 on reader card

ICS Electronics Announces IEEE 488/GPIB/HP-IB Interfaces

ICS Electronics Corp. announced two IEEE 488/GPIB/HP-IB interfaces. The new "Mini-Box" ICS GPIB to Printer Interface, Model 4892, and the GPIB to Serial Interface, Model 4894, incorporate the new IEEE 488.2 standard and Standard Commands for programmable Instruments (SCPI) Commands that will assure compatibility with future instruments and programs.

All Mini-Box interface functions and GPIB Bus characteristics are programmable from the IEEE 488 Bus. Their configurations are stored in E2ROM and can be changed as needed. Both Mini-Boxes have a 256K RAM buffer that stores up to 252,000 characters and have a data transfer rate of greater than 600 KB per second.

The 4892 is a transparent IEEE 488/GPIB/HP-IB to printer interface that transfers data in parallel, 8-bit bytes and is commonly used with a printer or plotter that have the industry standard Centronics interfaces.

The 4894 is a transparent, bidirectional IEEE 488/GPIB to RS-232C and RS-422/RS-485 Serial Interface and will drive any device with a serial interface from the GPIB Bus. In the reverse direction, the 4894 will connect a computer's serial port to an IEEE 488 device.

The 4892 IEEE 488/GPIB/HP-IB to Printer Interface, and the Model 4894 IEEE 488/GPIB to Serial Interface are priced at \$495.

Contact ICS Electronics Corp., 744 S. Hillview Drive, Milpitas, CA 95035; (408) 263-5500.

Circle 397 on reader card

PV-WAVE Version 3.1 Supports HP, IBM

Precision Visuals Inc. released Version 3.1 of PV-WAVE Command Language, adding IBM RS/6000 and HP Apollo 9000 Series 700 support to its family of Visual Data Analysis (VDA) products. Support for other

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platforms include all HP 9000 Series 300/400s, DEC machines, and Sun and Silicon Graphics workstations.

The PV-WAVE product family features a Command Language version for programmers and a Point & Click version for non-programmers. With Version 3.1, a single tape can support Sun, DEC, HP, IBM and SGI workstations, allowing a license to be shared around a multivendor network. Through a new shared window ID, users can open an X window and have other software write to it, and vice versa.

Additional enhancements to Version 3.1 include an Advanced Rendering Library containing procedures and examples for volumetric display, gridding, coordinate conversion, 3-D vector plots, volume slicing and translucency.

Contact Precision Visuals Inc., 6260 Lookout Rd., Boulder, CO 80301; (303) 530-9000.

Circle 396 on reader card

Blue Kit Connects IBM Computers To LaserJet

MPI Technologies Inc. introduced The Blue Kit, a coax/twinax IPDS emulation package that provides HP LaserJet printer compatibility with IBM mainframe and midrange computers. The Blue Kit consists of a coax/twinax interface boards and an IPDS emulation cartridge, and is installed in LaserJet printers with at least 1 MB of extended RAM.

With The Blue Kit, the HP LaserJet can be used in three modes; by a PC in PCL mode; by the IBM mainframe or midrange in IPDS mode; or by an IBM mainframe in non-IPDS mode. Automatic sharing allows the printer to switch between the PC and the IBM host without any front-panel intervention.

The Blue Kit's 48 permanently stored fonts provide complete compatibility with the IBM 4028, even for typographic or proportional typefaces.

The Blue Kit also provides selected fonts for the IBM 3812/16 Model 2. An optional "50 IPDS Font" cartridge is available as well.

The Blue Kit is priced at \$2,600 and allows HP LaserJet Series II, IID, III and IIID printer models to emulate IBM's new 4028 laser printer as well as the IBM 3812 Model and 3816.

Contact MPI Technologies Inc., 4952 Warner Ave., Ste. 301, Huntington Beach,

CA 92649; (714) 840-8077.

Circle 395 on reader card

Pantech Inc. Enhances DataOne Migration Software

Pantech Inc. improved DataOne, its IMAGE to ALLBASE migration software. DataOne converts IMAGE schemas to ALLBASE schemas, creates the ALLBASE database, then loads the new SQL database directly from the IMAGE files. DataOne then provides complete IMAGE call emulation that allows users to run their IMAGE applications unmodified against the ALLBASE database that was created.

Enhancements in DataOne Version 2.0 include support of referential integrity under MPE XL 3.0, the ability to access up to 20 open databases simultaneously, support for applications written in POWERHOUSE and QUERY, and support of many third-party tools and programs including SUPRTOOL, TEXTPRO and NETWORK. DataOne now provides the flexibility to copy your ALLBASE data back to your IMAGE database, even if it has been updated since original conversion by DataOne.

DataOne Version 2.0 works on any HP 3000 Series 900 using MPE XL 2.1 or later, with any standard programming language except BASIC. Price is according to cpu size. Contact Pantech Inc., 89 Mountain Valley Rd., Oakland, CA 94605; (415) 451-2381.

Circle 394 on reader card

WRQ Unveils Reflection 1 Version 3.7

Walker, Richer & Quinn Inc. announced Reflection 1 for Windows Version 3.7, featuring 132-column support, keyboard remapping, color attributes and dynamic data exchange (DDE) support.

Reflection 1 provides HP 2392A terminal emulation and file transfer and takes full advantage of the memory management and multitasking features of the Microsoft Windows environment.

Reflection 1 runs in protected mode, leaving room for large PC applications to run at the same time as host sessions. With a host session and a PC application side-by-side, the user can copy a piece of text from the host and paste it into the PC application or vice versa via the Windows Clipboard.

The DDE support available in version 3.7 of Reflection 1 for Windows lets two or

more Windows applications, including host applications running in the Reflection window, share data.

Contact Walker, Richer & Quinn Inc., 2815 Eastlake Ave. E., Seattle, WA 98102; (206) 324-0350.

Circle 393 on reader card

LeeTech Releases DBA/QUERY For ALLBASE/SQL

LeeTech announced DBA/QUERY, a data manipulation and report generation tool for ALLBASE/SQL, providing ALLBASE/SQL users an interface similar to TurboImage QUERY.PUB.SYS.

DBA/QUERY is a superset of TurboImage QUERY.PUB.SYS that provides a set of functions for the user to do fast data load/unload, to execute standard editor procedure files, to do joint/multifind in one command, and to redo any previous command. For experienced TurboImage users, DBA/QUERY users can simply take existing report procedures and execute them against their ALLBASE/SQL database

without conversion.

Contact LeeTech Software Inc., 20410 Town Center Lane, Ste. 220, Cupertino, CA 95014; (408) 253-1987.

Circle 392 on reader card

EZ-LETTER 3.0 Combines CICS-Based Letter Link Features

Group 1 Software announced EZ-LETTER System 3.0, a mainframe personalization system that generates correspondence unique to each addressee within a business mass mailing. The new version includes both EZ-LETTER Batch and EZ-LETTER Online, a CICS-based product formerly known as LETTER LINK.

With EZ-LETTER, users can compose documents in proportional and multipitch fonts automatically, dynamically create multiple output files with one pass of the input data file for more efficient processing of separate mailings to different groups of recipients, and create, store and centralize "boilerplate" text that can be inserted directly into a document on demand.

The EZ-LETTER Online portion of the system incorporates intuitive screens and online help all based on IBM's SAA/CUA standards. These allow users trained on one application of the product to learn new applications easily. In addition, EZ-LETTER Online features a security facility to protect customer information and control user access to system functions.

Contact Group 1 Software, Washington Capital Office Park, 6404 Ivy Lane, Ste. 500, Greenbelt, MD 20770; (301) 982-2000.

Circle 391 on reader card

ISICAD Integrates COMMAND With OpenView

ISICAD announced the integration of COMMAND with HP OpenView network and systems management products, providing the capability to identify network problems at one workstation.

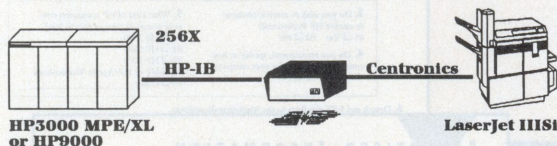
COMMAND (Communications Management and Design) software allows documentation of network infrastructure, including components, cabling routes and

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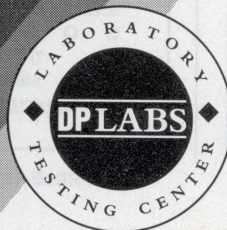
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connections. Using both graphics and database capabilities, COMMAND provides the tools necessary for communications design, change management and troubleshooting.

HP OpenView provides an environment that supports HP's network management products and is available on a variety of platforms including HP 9000 workstations, Sun workstations and MS-DOS PCs. Contact ISICAD Inc., 1920 West Corporate Way, Anaheim, CA 92803-6122; (714) 533-8910.

Circle 390 on reader card

Applix Offers Asterix For HP Apollo Workstations

Applix announced Asterix X Window System office integration software on HP Apollo 9000 Series 700 and 800 workstations.

Asterix is an X Window System office integration package that includes word processing, integrated graphics, a set of easy-to-use macro tools, optional spreadsheets, mail

and filter packs. Asterix is priced at \$695. Contact Applix Inc., 112 Turnpike Rd., Westboro, MA 01581; (508) 870-0300.

Circle 381 on reader card

Camintonn Offers Memory Upgrades

Camintonn Corp. announced memory upgrades for the HP Apollo 9000 Model 700 series workstations. Depending upon the model, Camintonn's 100 percent compatible memory expansion modules can upgrade an HP Apollo 9000 system memory to 192 MB.

Camintonn's CMH-9700 series memory modules are ECC memory upgrade kits installed into the HP Apollo 9000 Models 720, 730 or 750. The 8 MB kit uses 1 megabit SOJ DRAM, while the 16 and 32 MB versions use 4 megabit SOJ DRAM for maximum density and minimum power consumption.

Camintonn also released the CMH-9425e memory expansion module for the HP Apollo 9000 Model 425e, capable of

upgrading performance to 48 MB, and the Z-RAM PC memory upgrades, 100 percent compatible memory upgrades for 386, 386SX, 486 and 486SX PCs offered by IBM, Compaq, AST, Toshiba, Apple and HP LaserJet printers.

Contact Camintonn Corp., 22 Morgan, Irvine, CA 92718-2022; (714) 454-6500.

Circle 366 on reader card

MicroPrint 45 CXA Improves HPIB To Centronics Converter

Intelligent Interfaces announced its new input/output converter, MicroPrint 45CXA. The new model converts HPIB (IEEE 488) to industry standard Centronics protocol. Operating at 30 KB per second, the 45CXA makes an ideal solution for interfacing HP computers and instrumentation to the new HP LaserJet II and III printer series.

Also new, external switches now permit selection of HPIB ADDRESS or LISTEN ALWAYS mode. The new MicroPrint also can be reset with the HPIB INTERFACE

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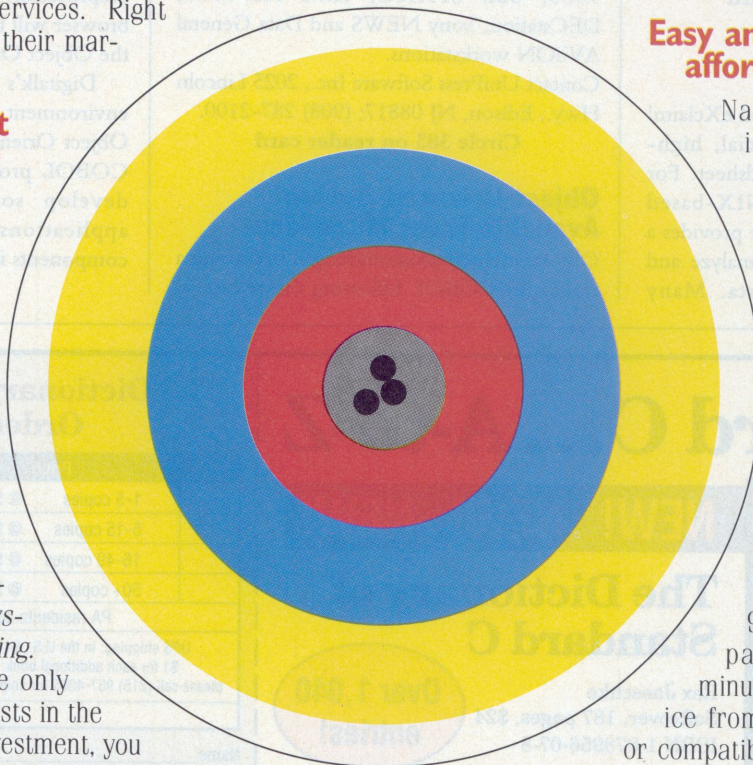
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MicroPrint 45CXA comes ready to plug into a standard HPIB cable on one side, and parallel interface cable on the other. The unit is completely transparent to host computer hardware, operating system and applications software. It requires no programming.

The MicroPrint 45CXA with wall mounted power supply and 10 foot centronics cable is available for \$259.

Contact Intelligent Interfaces Inc., P.O. Box 1486, Stone Mountain, GA 30086-2486; (404) 381-9891.

Circle 385 on reader card

UniPress Announces eXclaim! RealTime

UniPress Software Inc. announced eXclaim! RealTime, a specialized financial, high-performance X Windows spreadsheet. For securities traders using UNIX-based workstations, eXclaim! RealTime provides a means to continuously display, analyze and monitor current financial data. Many

electronic online datafeeds including Quotron, Dow Jones, TeleRate, Reuters and DECTrade's Price Watch, are supported.

eXclaim! RealTime provides all the advanced X features of eXclaim! Spreadsheet including mouse control, pull-down menus, scroll bars, dialog boxes and X graphics. The X Window environment allows the user to work with real-time spreadsheet in one window while running additional programs in other windows, increasing user efficiency.

eXclaim! RealTime is priced at \$1,850 per user. eXclaim! RealTime is available for HP 9000, Sun SPARC, IBM RS/6000, DECstation, Sony NEWS and Data General AViiON workstations.

Contact UniPress Software Inc., 2025 Lincoln Hwy., Edison, NJ 08817; (908) 287-2100.

Circle 383 on reader card

Object Oriented Option Available From MicroFocus

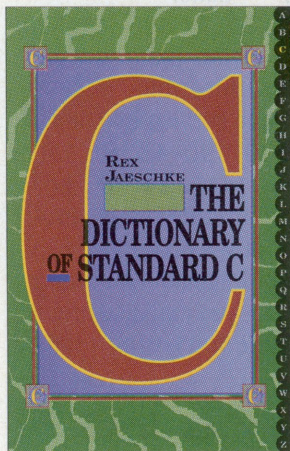
Object oriented programming is becoming a reality for COBOL following the release of

the Object Oriented Option for Micro Focus COBOL/2 Workbench.

The Object Oriented Option brings object oriented capabilities to the COBOL Runtime System (RTS). With the Object Oriented Option, multiple copies of a COBOL program can exist concurrently in the RTS. Each program becomes an object that contains its own encapsulated data. The procedures that constitute the object's external interface are manifested as entry points to the program. These objects can be saved and restored across runs. A preprocessor, class library and class hierarchy browser will bring additional functionality to the Object Oriented Option.

Digitalk's Smalltalk/V PM development environment also is included as part of the Object Oriented Option. This feature offers COBOL programmers the opportunity to develop some components of their applications in Smalltalk and other components in COBOL.

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Contact Micro Focus Inc., 2465 E. Bayshore Rd., Ste. 400, Palo Alto, CA 94303; (415) 856-4161.

Circle 382 on reader card

IIS Introduces CIIM on SYBASE

Interactive Information Systems (IIS) released its Computer Interactive Integrated Manufacturing (CIIM) software family on the SYBASE relational database management system.

CIIM offers customers a manufacturing solution that delivers SYBASE's client-server architecture, high online transaction processing performance and integration capabilities for the computer manufacturing enterprise.

CIIM on SYBASE currently operates on Version 4.0 of the SYBASE SQL Server. It's developed in Sybase's 4GL environment, APT workbench, to deliver a more tightly integrated solution than other manufacturing systems which are linked to SYBASE through an interface or gateway.

Contact Interactive Information Systems, 3716 E. Columbia, Suite 120, Tucson, AZ 85714-3414; (602) 790-4214.

Circle 372 on reader card

Wilco AMS LaserCard Si Offered For HP LaserJet IIISi

Wilco AMS Inc. announced the LaserCard Si family of plug-in printer sharing systems.

Offering high speed throughput to the HP LaserJet IIISi internal backplane, LaserCard Si lets office and classroom workgroups share the cost and performance of the IIISi printer between as many as 15 computers. LaserCard plugs into the IIISi MIO slot, eliminating the need for a power connection or additional desk space.

Up to 14 high-speed serial ports utilize four wire, telephone-style modular cables providing an easy-to-connect and low-cost cabling method. LaserCard includes LASER.EXE, and IBM PC and compatible software utility that increases serial transmission to 115.2 Kbaud. A single high-speed IBM PC-style parallel input port is included for the connection of a nearby PC or a network server. Individual port settings for baud rate, timeout, copies, header strings and end of job settings can be programmed directly from the LaserJet IIISi's control panel or via software/batch files.

LaserCard Si provides hardware (DTR)

and software (XON) handshaking as well as Robust-XON with terminal type 22/26 status checking support for HP 3000 connections to the IIISi.

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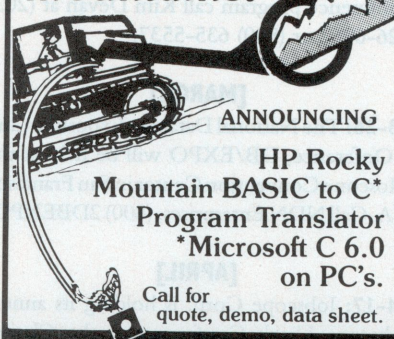
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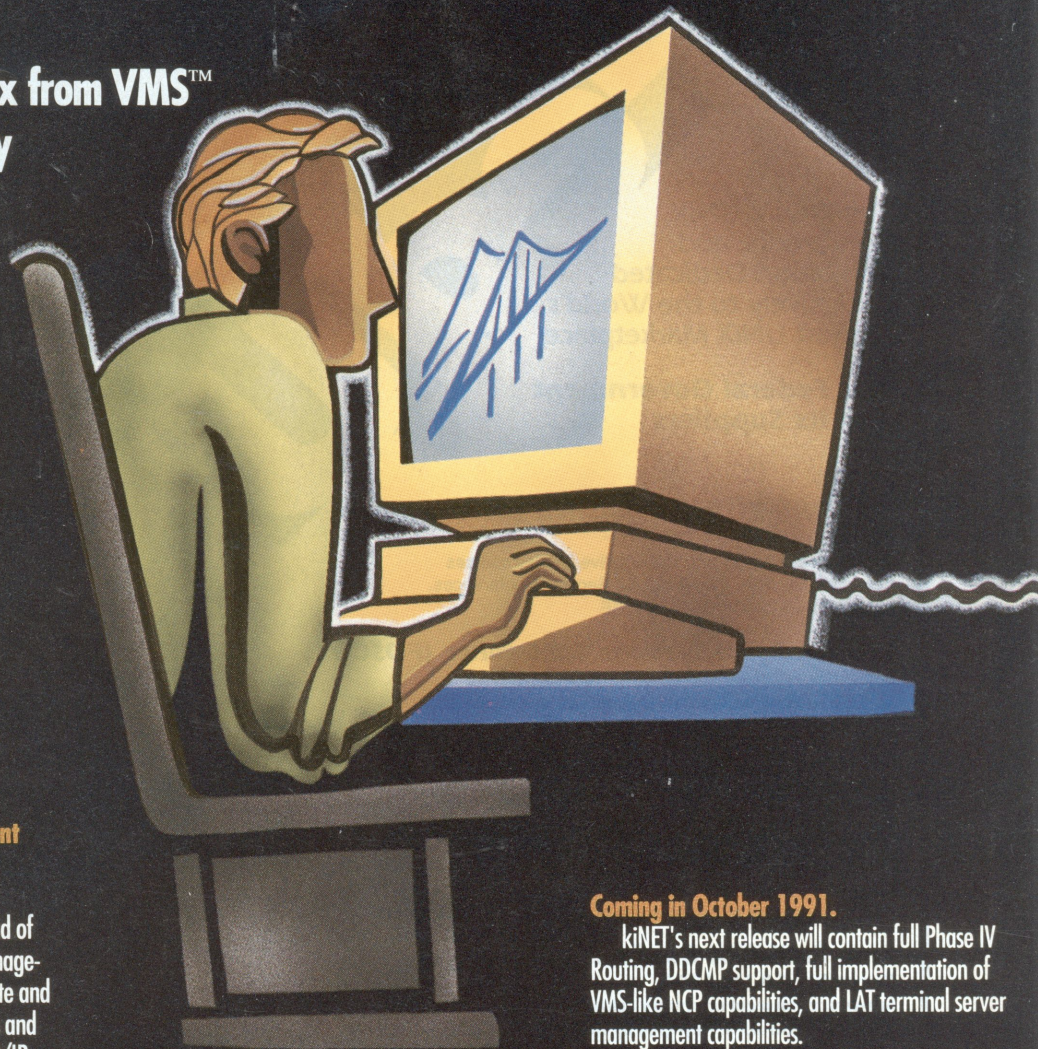
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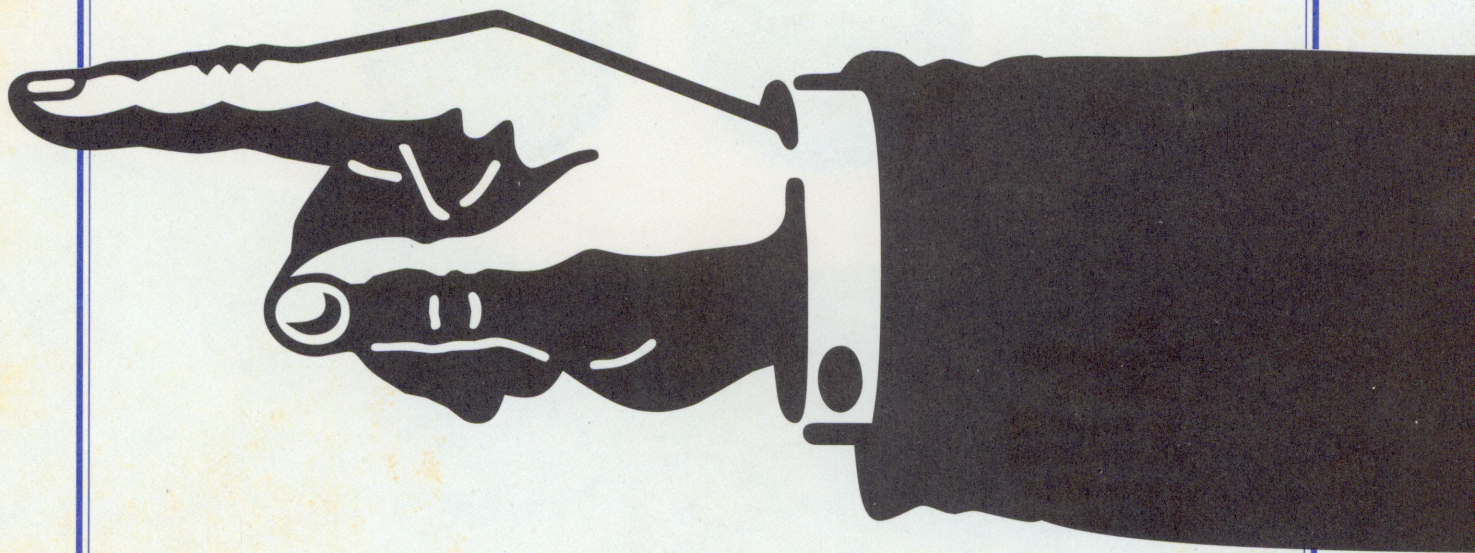
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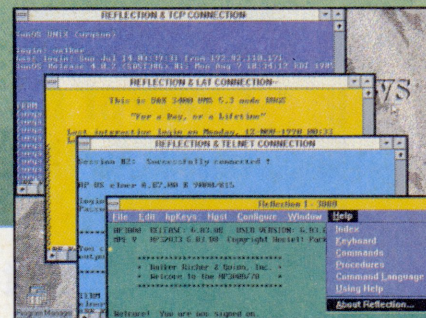
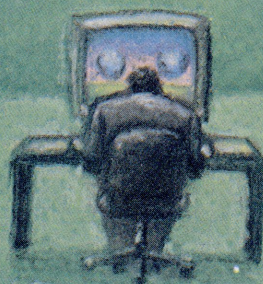
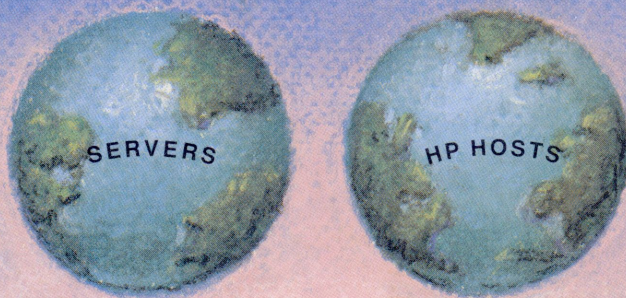


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